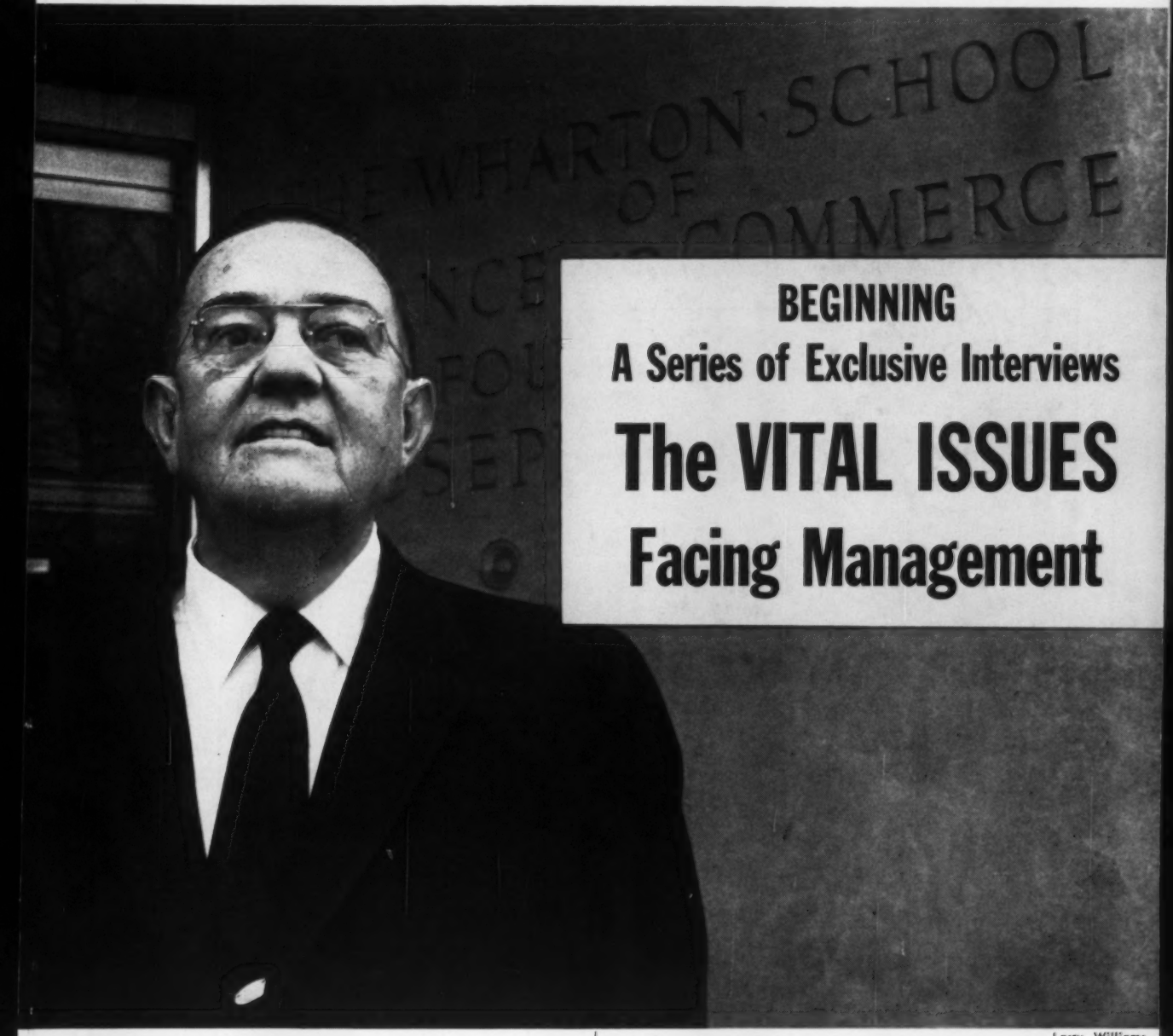
IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication MARCH 16, 1961



Larry Williams

BEGINNING

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The VITAL ISSUES Facing Management

★ Labor Expert George W. Taylor

Should the Public Take Part In Labor Negotiations? p. 90

First Hearings on Automation p. 79

Are Welding Codes Outdated? p. 109

Digest of the Week p. 2-3

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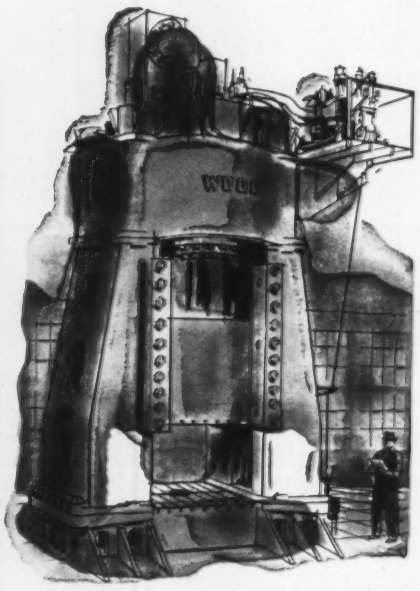
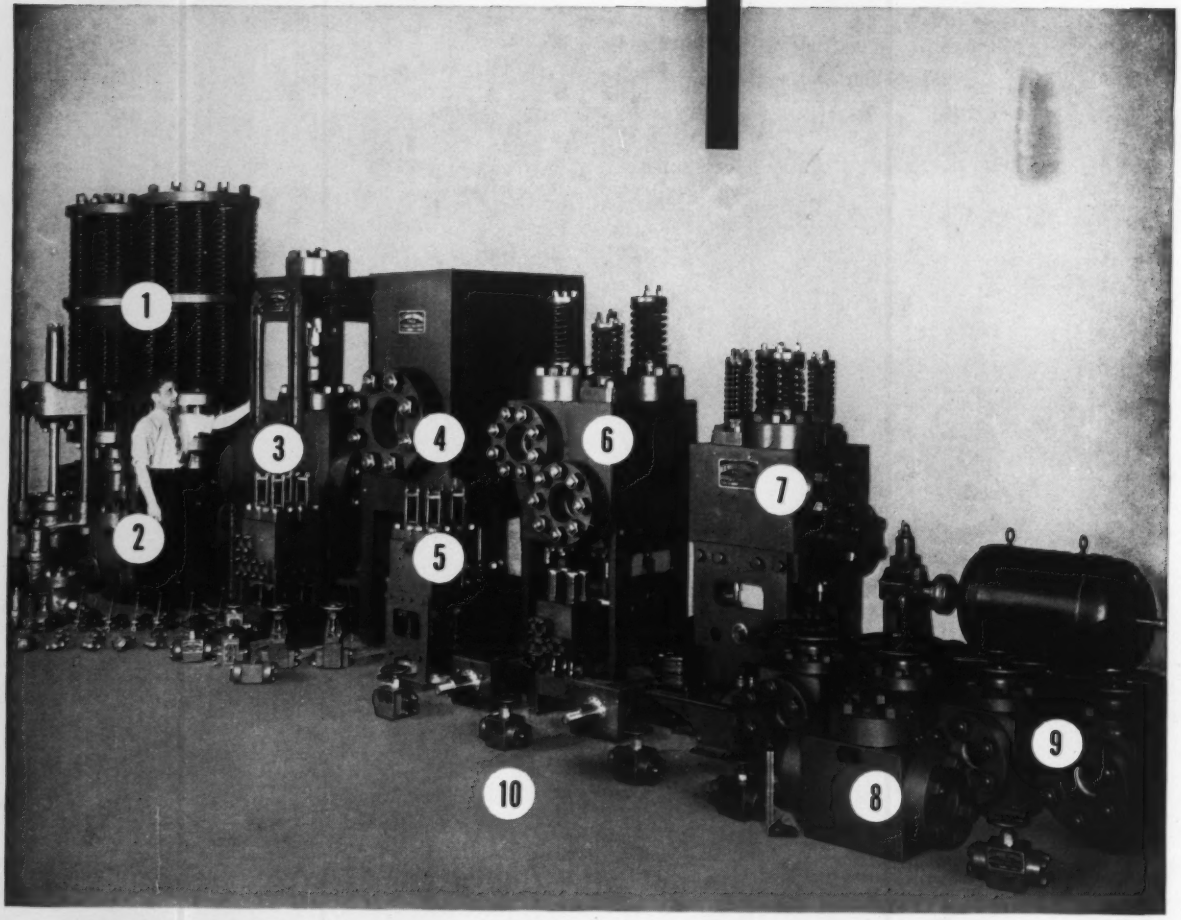
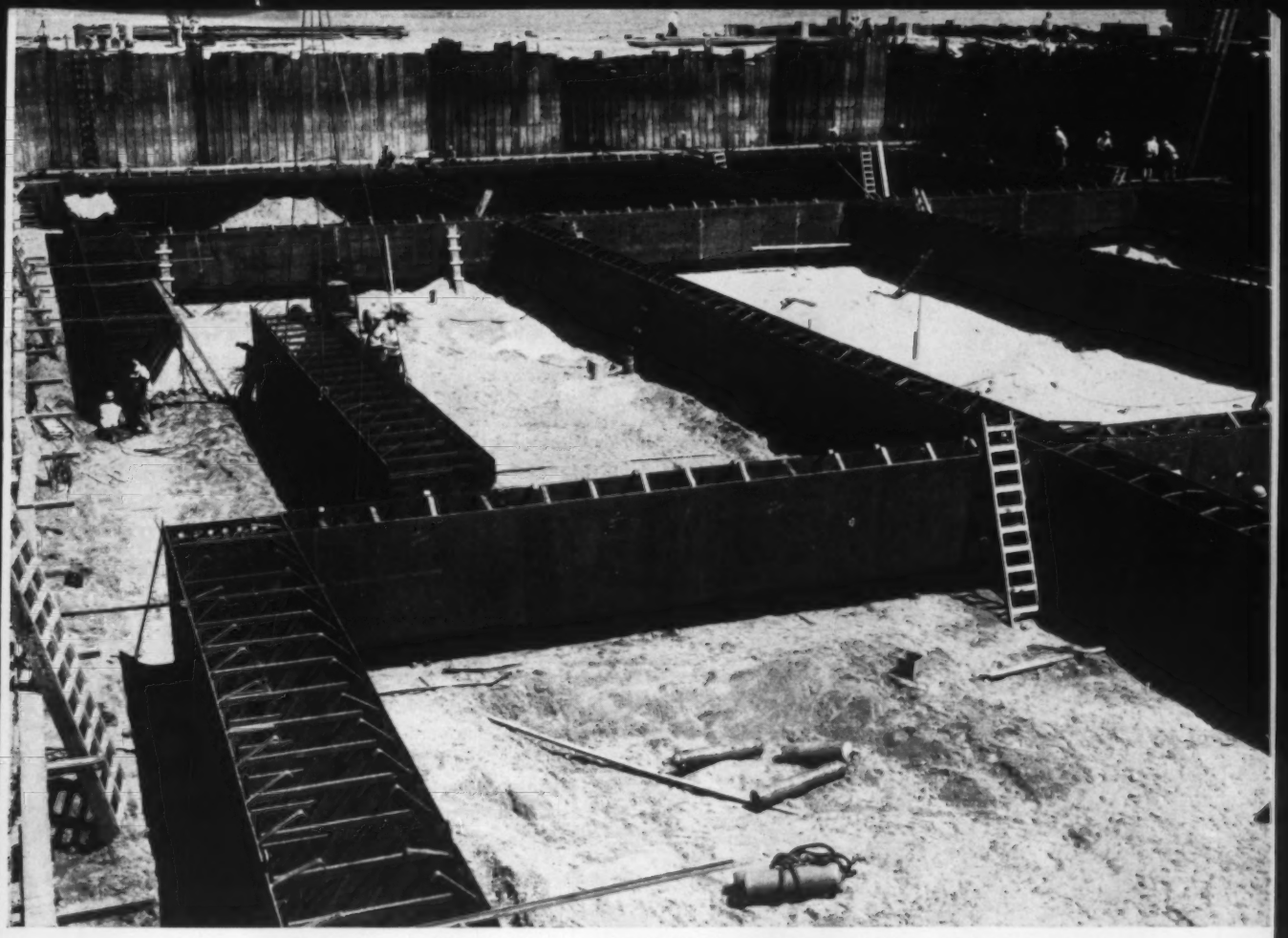




1. 6″x8″ Shock Alleviators **2.** 2½″x4½″ Twin Tilting Valve **3.** 9″ Accumulator Shut off Valve **4.** 9″ Accumulator Safety Shut off Valve **5.** 1½″ Mandrel Gear Control Valve **6.** 6″ Control Valve **7.** 4½″ Control Valve **8.** 4″ Check Valve **9.** 4″ Stop Valves **10.** Misc. Stop, Check and Control Valves



Cutting edge assembly on the job site covers nearly 30,000 sq ft. The Verrazano-Narrows Bridge is being built by Triborough Bridge and Tunnel Authority. Ammann & Whitney are the consulting engineers. Steers-Snare is general contractor.

Cutting edges for huge caisson fabricated from Bethlehem manganese-vanadium plate (ASTM A 441)

Bethlehem plates of manganese-vanadium steel—a high strength, low-alloy grade which meets the requirements of the new ASTM Specification A441-60T—were used in fabricating the caisson cutting edges for the foundations of the Verrazano-Narrows Bridge tower piers. Bethlehem manganese-vanadium was an economical choice because of its good welding qualities and the saving in weight due to its high strength.

The cutting edge assemblies, each of which covers nearly 30,000 sq ft, were pre-fabricated by Elizabeth Iron Works, Elizabeth, N. J. Each contains 28 sub-assemblies, and assembly on the job site required about 11 miles of welding.

Bethlehem manganese-vanadium steel plates were fabricated by Elizabeth Iron Works.

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March 16, 1961—Vol. 187, No. 11

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Indexed in Applied Science & Technology Index and Engineering Index

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The IRON AGE, published every Thursday by CHILTON COMPANY, Chestnut & 56th Sts., Philadelphia 39, Pa. Second class postage paid at Philadelphia, Pa. Price to the metalworking industries only, $2 for 1 year, $3 for 2 years in U.S. and Canada; all others $15 for one year. Latin America $25. Other Foreign $35. Single copies 50¢. Annual Issue $2. Cable: Chilton Philadelphia.

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Special This Week

The Public and Labor Disputes

One of the most controversial issues in business today involves this question: Should the public take part in labor negotiations? Labor relations specialist Dr. George W. Taylor believes third party participation may help in solving critical issues. ***p. 90***

Unions Bid for 32-Hour Week

United Steelworkers turned House unemployment and automation hearings into a sounding board for a short workweek. Testimony also gave clues to labor's next major goals—from companies and the government. ***p. 79***

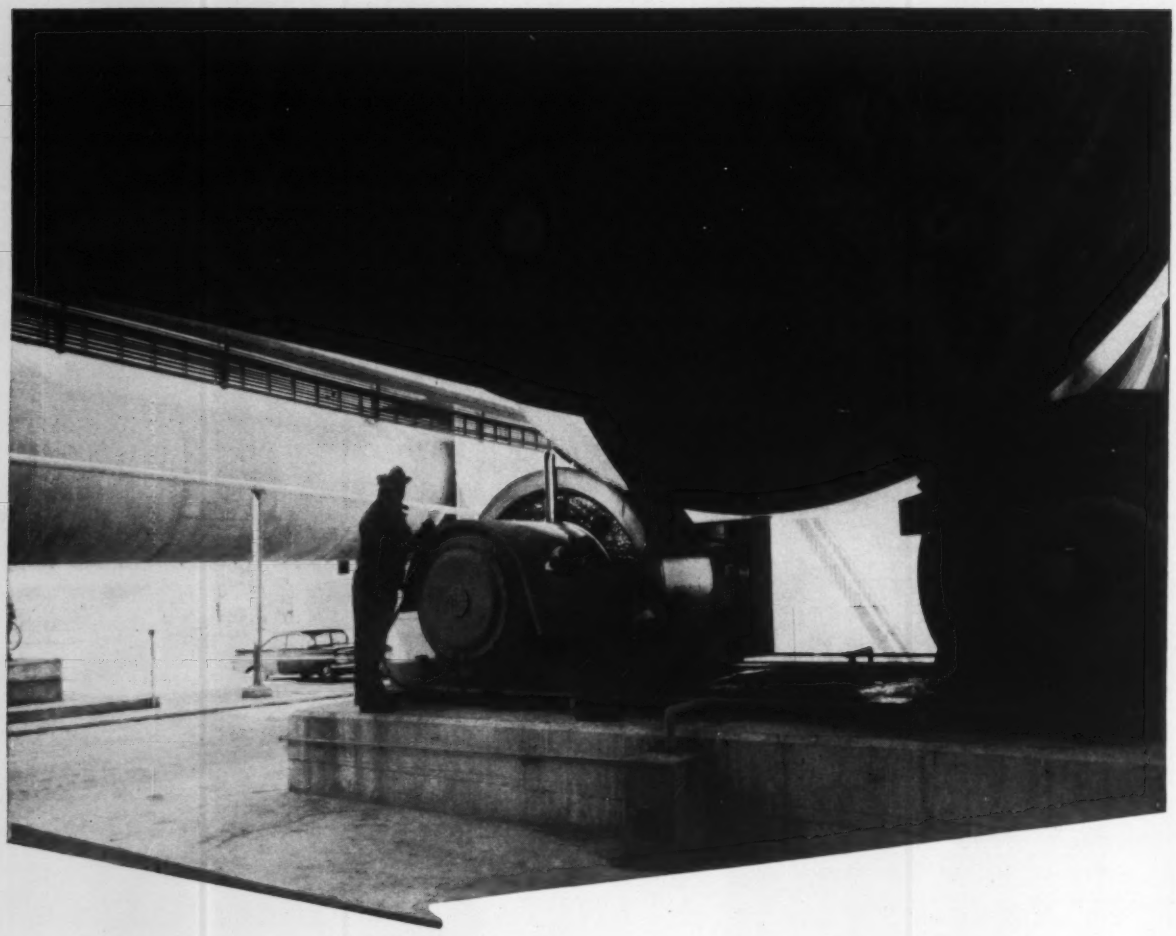
Are Welding Codes Outdated?

Modern welding processes have come of age. But the codes that govern these processes haven't kept pace with today's welding methods. Mounting evidence proves that present welding codes should be rewritten. ***p. 109***

Next Week

Doing Business in Japan

Editor-in-Chief Tom Campbell is now in Japan preparing a series of articles on the country's industrial growth, as a competitor and a market. Next week, he discusses the problems of an American doing business in Japan.



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Report From Japan

Outside the U. S. A. It Is Not the Same as Inside

At home, foreign aid, foreign trade, the Free World, democracy and ethics fall into a neat pattern of thought. Not so when you are far away from home.

Then these things become far more complex. One starts—if he is honest with himself—to do a little soul searching in an attempt to remove confusion.

Take the question of trade with Japan. At home there is great talk about embargoes, quotas, boycotts—and "Buy American." There is nothing unusual about this, coming from those who are hard-hit by imports.

While these feelings are being generated, President Kennedy and his advisors must also look at the "big picture"—something that affected people and companies have a hard time doing, if ever they can. Thus, we have a problem that can't be solved by ordinary American-type snap judgment.

Japanese officials suggest that if Japan buys heavily from the U. S., why should not Americans buy just as heavily from Japan? That, too, is a hard question to answer. It is not as simple as it sounds. At present Japan is our biggest buyer, next to Canada.

In America those favored with Japanese business are strong supporters of big trade with Japan. Those in textiles, cameras, optical goods and transistors often have a different outlook. That, too, is natural.

Leading Japanese are well aware of our dilemma. They have theirs too. More than 92 million people in a small area pose quite a question for those responsible for their growth, living, and future progress. Japan must export or die on the vine. She won't die.

Japan continues to make efforts to soften the blow of heavy imports to the U. S. Consultations go on endlessly. Often, though, when Japan self-imposes export quotas, "others" take up the slack. Back home, no distinction is made that Japan has voluntarily cut back.

When we ponder this difficult trading problem, we should recall a few things. Japan is our major friend in the Far East. She is a bulwark against Red China. She must trade to live. It is well that we figure in each others' plans for the future.

No matter what we think about our trade with Japan, we must admit her importance to us. This is much clearer here in the Far East than it seems sitting in an office in New York, Philadelphia, Pittsburgh, Los Angeles, or Washington.

Tom Campbell

Editor-in-Chief

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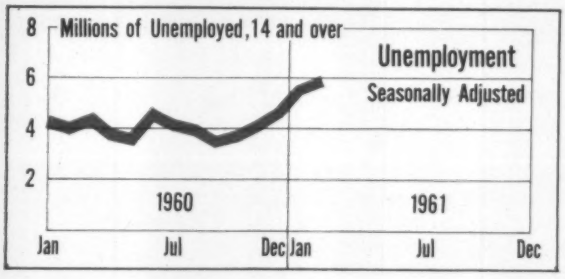
Unemployment the Big Problem

Unemployment is likely to be the toughest nut to crack when the economy takes an upturn. It has been the pattern in recovery periods that employment lags far behind production gains in an upturn of the business cycle. In fact, this lag becomes more and more



apparent after each recession period.

Still, this is the first recession period when economists, both in business and out, accept this lag as a fact of life. That's why the current high level on jobless (around 5.7 million or about 6.8 pct of the work force) is so disturbing. A moderate pickup is not likely to restore a proportionate number to payrolls. It will take a recovery of boom proportions to restore unemployment to what is now considered an "acceptable" 4 pct of the work force. (For more on unemployment problems, see Special Report, P. 79).

Auto Production Clouded

Automakers are waiting for March 1-10 sales reports to come in before making further decisions on the month's production. Right now, the industry is still thinking in terms of 400,000 cars for March. If early March sales look better, the figure might be pushed up a bit.

As it stands now, shutdowns of assembly plants are making all the automotive news. Buick, Oldsmobile and Pontiac closed their Michigan assembly plants for a week starting March 13. The six B-O-P plants nationwide are also down for a week. Most other automakers have had varied periods of idleness in recent weeks.

Machine Tool Straws in the Wind

The U. S. machine tool industry doesn't expect much direct benefit from recent devaluation of German currency. Although it has the effect of narrowing the price gap, the amount is comparatively small compared with the wide wage differential.

However, as it reflects moves by U. S. government agencies to level some of the disadvantages facing U. S. metalworking products abroad, it is viewed as a step in the right direction. Further actions to assure that more foreign aid dollars will be spent in the U. S. for American equipment is another step.

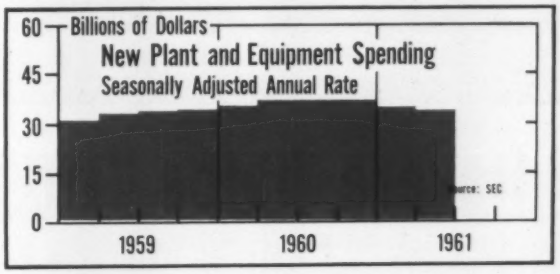
Meanwhile, some government tool purchases are being expedited, particularly for AEC work. All these factors are being watched closely by tool builders for market clues.

Mixed Views on Capital Spending

The outlook for capital spending has its good and bad side. Expenditures for new plants and equipment are expected to move up in the second half of this year. But first quarter spending did not live up to announced plans. Further, second quarter plans are not up to first quarter levels.

According to the current survey conducted by the Dept. of Commerce and the Securities and Exchange Commission, here is how capital spending shapes up:

First quarter spending was estimated at a seasonally adjusted annual rate of $35 billion. It actually will hit only about $34.4 billion. Second quarter plans call for spending at a rate of $33.8 billion. But on the basis



of improved expectations in the second half, the total for the year should reach $34.5 billion. This compares with actual spending of $35.68 billion in 1960.

As expected, durable goods industries are among those cutting back most, about 7 pct from 1960.

Farm Market Looks Better

Farm equipment makers were burned by overproduction in 1960. That's one reason for a cautious approach that tempers some optimism. Industry sources say orders are starting to pick up this year but caution that the third quarter will be the make-or-break period for 1961. Behind the cautious optimism: The outlook for higher farm prices this year and a continuation of the trend to more farm automation.

AGAIN-

Shown here is the 6" Rapidaytor Dolphin Submersible Pump, one of a complete line of 4" and 6" pumps made by THE TAIT MANUFACTURING COMPANY, Dayton, Ohio. Arrow points to the upper body shell made of Revere seamless leaded brass tubing. Hand holds the diffuser casing made of Revere Brass Strip and used inside pump.

Revere helps "fit the metal to the job"

AND A PUMP MANUFACTURER FABRICATES SUPERIOR PARTS WITH GREATER EASE . . . INCREASES TOOL LIFE

An important part of the submersible pumps made by Tait Manufacturing Company is the brass diffuser casing you see above. This part had formerly been made of ferrous metal. While satisfactory as a pump part it was difficult to work and draw . . . at the same time tool life was short.

One of Revere's Technical Advisors was asked to study the problem. Revere Cartridge Brass Strip of a certain temper was recommended, samples submitted, and, after extensive tests, was approved. The customer has found that not only does the diffuser casing, made of Revere Brass, perform well in the pump, but it also has superior drawing properties, is more easily worked, and tool life has been substantially increased.

This meticulous attention to "fitting the metal to the job" also resulted in Tait Manufacturing Company's specifying Revere seamless leaded brass tubing for the upper body shell of its submersible pumps. Here the application called for extremely close straightness and roundness control which meant special attention to detail on the part of the Revere mills.

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Teamsters: Hot Water Over Hot Cargo

National Labor Relations Board has challenged the Teamsters' "protection of rights" clause.

Written into contracts covering a large part of the trucking industry, the clause is designed to get around the Landrum-Griffin Act ban on "hot cargo" contracts (IA—Nov. 24 '60, p. 9).

A NLRB complaint against the union is based on charges by Brown Transportation Corp., Atlanta. The trucking company charges it is being picketed by the Teamsters to accept a contract with the "protection of rights" clause.

Brown charges this violates the law's ban on boycotts to force an employer to sign "hot cargo" pact. The law also forbids an employer to enter into such a contract.

AFL-CIO: Pressure On Congress

Walter P. Reuther, UAW president and head of the AFL-CIO's Industrial Union Dept., told 1100 union representatives to "put the pressure upon the Congress" to get favorable legislation. The group was in Washington last week for just that purpose.

Primary targets: Minimum wage bill, medical care for the aged, aid to education, low-cost housing, and other Federal spending programs.

Strikes in January Set Low for Month

About 170 work stoppages began in January, 1961. This was the lowest number for the month in the postwar period, according to preliminary estimates of the Dept. of Labor.

Some 80,000 workers were idled by the stoppages. An additional 20,000 workers were involved in 130 stoppages continuing from December, 1960.

The total of 700,000 man-days lost in January due to strikes was substantially less than in the same periods of 1959 and 1960. Then, man-days lost totaled 1.8 million and 1 million respectively.

Labor-Management

President Kennedy's Committee on Labor-Management Policy held its first meeting this week. The 21-member group, headed by Labor Secretary Goldberg, was scheduled to meet with the President at the White House on Tuesday.

USWA: Pact Extended With Kaiser Steel

United Steelworkers of America has agreed to extend its present labor contract with Kaiser Steel Corp. for another year. (For more on Kaiser and USWA, see cover story on p. 90).

Current contract was scheduled to expire this June 30. It has been extended to June 30, 1962, the same date when union contracts expire with other major producers.

If no settlement is reached by the expiration date next year, Kaiser's contract will automatically be extended for 60 days.

Extension provides an 8.5¢ wage increase in October, compared with 7¢ for basic steel.

New Jobs Trail Work Force

Month after month, both employment and unemployment have been going higher than a year ago.

The rise in people out of work reflects primarily the failure to increase job opportunities as rapidly as the labor force expands, Jules Backman, research professor of Economics at New York University told the Associated Industries of Cleveland last week.

"On balance . . . a modified economic environment . . . could result in a sounder basis for long-term economic growth than that which prevailed in the last 15 years," he added.

"Nevertheless . . . modification will eliminate some of the yeastlike elements which have played so important a role in recent years."

In the labor picture, Prof. Backman hailed "progress against featherbedding." He noted Detroit painters have eliminated premium pay for using rollers, Chicago plumbers removed restrictions on some power tools, longshoremen agreed to containers and railroad brotherhoods are submitting data to a Presidential Commission. He also noted steel industry study groups and reduction of crew sizes by several important firms.

Prof. Backman predicted a continued sluggish business activity in the first half of 1961 with some upturn in the latter part of the year.

"It must be emphasized that the present unemployment situation does not provide the background for increases in wages and other labor costs," he said.

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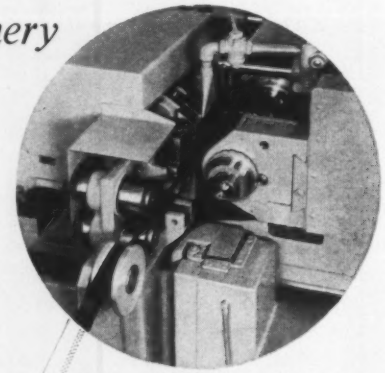
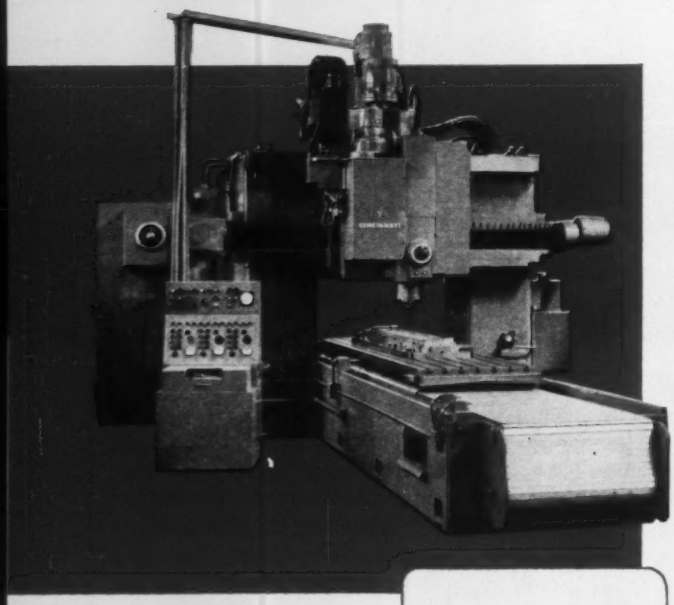
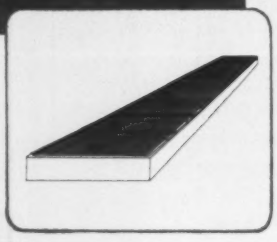
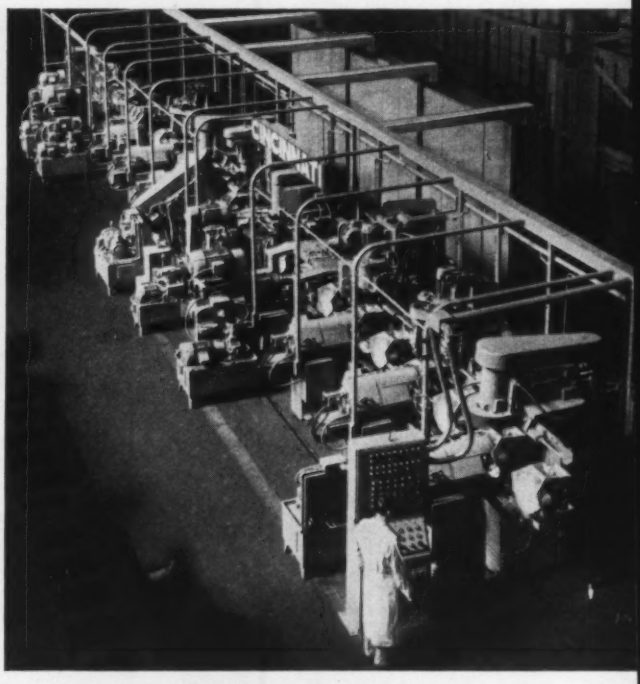


CINCINNATI Automatic Band Saw Blade Milling Machine. In a completely automatic operation, stacked blades are advanced from reels by a unique shuttling action, and teeth are milled with a 4" wide cutter.





ACRAMATIC Numerical Control commands this Bridge-Type Profile and Contour Milling Machine for milling pockets of an aircraft wing panel beam. This is one of several in a new generation of machines, completely built from the ground up by the Special Machine Division; designed specifically for numerically controlled milling on a variety of aerospace and general purpose parts made of aluminum, titanium, steel and the new "exotic" materials.



CINCINNATI 26-Station Unit Type Transfer Line. This efficient production line automatically mills, drills and bores transmission cases in 33 operations; inserts two bushings; banks excess parts; transfers the castings from one station to the next. Features include unit construction; one station for future engineering changes; complete static electrical control. Accuracy and finish obtained are excellent. The line cycles at the rate of 137 per hour.

CINCINNATI®

SPECIAL MACHINE DIVISION

DESIGNERS AND BUILDERS OF SPECIAL MACHINES • HORIZONTAL BROACHING MACHINES • COMPLETELY AUTOMATED PRODUCTION LINES

★Defense Will Revamp Bidding

The Defense Dept. now admits its industry bidding policies need a going-over.

After years of battling over the value of negotiated contracts over competitive bids, the Pentagon has agreed to give "particular attention" to greater use of competitive bidding.

The agreement came out of a meeting on defense procurement between Sen. Paul Douglas (D., Ill.), Defense Secretary Robert McNamara, and Budget Bureau Chief David Bell.

The meeting, called for by President Kennedy, appears to be the first step in the revamp of defense buying policies sought for so long by Sen. Douglas. It has been predicted that 1961 would be the year for action to control military waste. (See The IRON AGE, Feb. 16, p. 73.)

The meeting produced these agreements:

1. Particular attention will be given to greater use of competitive bidding.

2. Action will be taken to prevent concurrent buying and selling by the military.

3. Wherever possible, use will be made of commercially available items in lieu of more costly items of special design.

Those at the meeting also agreed they would meet periodically to review progress and discuss future objectives on improvement in defense procurement.

In discussing steps to obtain greater efficiency and economy in procurement, the group also covered elimination of common items in defense inventories, standardization of common items among the military services, and the use and disposal of excess and surplus supplies and equipment.

Critics of defense waste are now waiting to see what direct action the Defense Dept. takes.

■ GSA Buying Set-up Will Aid Metalworking

General Services Administration officials say the agency's new "Buy Faster" policy should boost metalworking sales.

GSA is now buying supplies for the government on an accelerated basis. Sources at the buying agency say it will mean $91.5 million in buying from industry between now and September.

Biggest portion of the funds will go for restocking GSA warehouses across the country. Items to be stocked include: Machine tool accessories; welding and metalizing equipment; metal business furniture; a myriad number of tools; wire; air conditioners and heaters; grinding machines; and engine components.

The "buy-now" action, coupled with GSA plans to channel procurement into labor-surplus areas, is in line with President Kennedy's directive to step up federal buying in "the present period of economic slack."

■ Study Backs Business On Patent Policy

In the face of Congressional calls to give the Government rights to all patents developed by industry under Federal research and development contracts comes this conclusion:

"There seems to be no urgent reason to alter the patent policies now in operation."

The conclusion is from a study by the Patent, Trademark and Copyright Foundation of George Washington University. The study was sponsored by the Government.

Industry has gotten support for the present system, which gives it the patent rights.

The report says:

"Both the license and title policies are working reasonably well."

"No strong case can be made for a uniform patent policy."

■ New Stockpiling Plan Appears Likely

New industrial mobilization stockpiling plans—including storing up space age metals, finished metal products and machine tool components—appear to be in the works.

The plans, formulated sometime ago, are expected to be part of "far reaching recommendations" for changes in U. S. industrial mobilization being made by new Civil and Defense Mobilization Director Frank B. Ellis.

Mr. Ellis, who calls the present defense mobilization program "completely inadequate," has submitted his plan to Present Kennedy for approval.

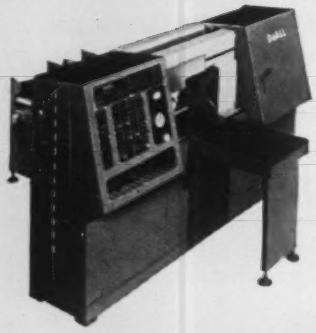
■ Will Electronic Brains Check Defense Plans?

The military is turning to electronic brains for checking the progress of Pentagon projects and coordinating weapon systems.

Defense Department Comptroller Charles J. Hitch says a system of electronic machines may be set up in the Pentagon to detect multi-billion dollar projects that may have to be junked after being started.

Another DoALL FIRST!

NEW SAW BLADE has tungsten carbide inserted teeth!



Continental Production Saw for continuous, heavy-duty cut-off production—fully automatic.

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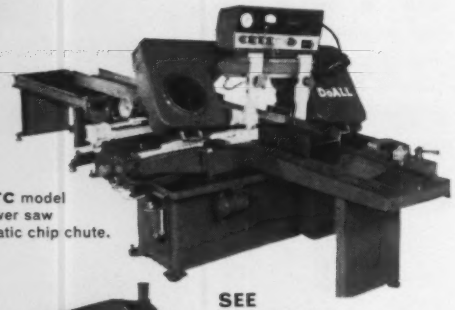

New C-70TC model DoALL power saw with automatic chip chute.

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ASTME SHOW
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DoALL Band Mill for heavy-duty slabbing, shanking, refacing, etc.—two-ton capacity.

It's another breakthrough by DoALL! The new Tungsten Carbide* band and machines shown here achieve fantastic performance in metal sawing.

For round-the-clock, faster cutting, this new band machining team sets new standards in productivity. This all-new blade combines the hardness of tungsten carbide teeth with the toughness of spring-tempered steel to give you the longest lasting, most heat-resistant and fatigue-resistant materials ever used in a saw band. Ground to dimension and sharpness, tungsten carbide teeth are uniformly set for high precision sawing. These new machines have the power, rigidity, controlled speed and feeds to fully utilize the cutting ability of tungsten carbide.

You Get These ADVANTAGES

- Most accurate sawing ever attained
- Teeth with highest red-heat hardness
- Teeth that withstand tremendous abrasion
- Teeth ground sharp for fastest cutting rate
- Band beam strength for heaviest feeds
- Spring-tempered alloy band for longest flex life
- Greatest productivity and economy

Call your local DoALL Sales-Service Store for complete data on this phenomenal saw band and demonstration on new Model C-70TC power saw.

Your DoALL Sawing Specialist has a new desk-side movie on tungsten carbide sawing. Call him today.

58-86

This is a typical DoALL Store

The DoALL Company, Des Plaines, Illinois

Central American Common Market Near

Four Central American nations have signed a General Treaty of Central American Economic Integration. The treaty was signed by Guatemala, El Salvador, Honduras, and Nicaragua.

The General Treaty, which is similar to the Treaty of Economic Association signed in February, 1960, broadens the scope of trade. It also sets up more specific means of financing economic integration.

It reportedly will lead the way to the forming of a common market for the countries involved. This common market should become a reality within five years.

Other agreements signed at the same time create: Uniform import duties from outside the region; a Central American Bank for Economic Integration to finance the move.

DLF Funds Face Hostile Congress

The additional $150 million lending authority sought by President Kennedy for the Development Loan Fund is in trouble in Congress.

The House Appropriations Committee so far has refused to OK the increase for the DLF, which grants loans to underdeveloped countries.

The committee pigeonholed action on the request pending the President's foreign aid proposals, which were supposed to be submitted to Congress this week.

Import Duties Up?

In an attempt to remove a deficit in next year's budget, India may raise excise duties on some metal products.

A proposal to this effect was made recently by Finance Minister Morariji Desai. It calls for a 50 pct rise in the duty on iron and steel products. Other increases proposed include: Machinery and components, 5 pct; and electrical instruments, 10 pct.

Hydro Pact Advances Ghana Aluminum

Another step toward aluminum from Ghana has been taken.

The Ghana government recently signed a $10.6 million contract with

GHANA: Contract Signed.

Kaiser Engineers and Constructors, Inc., of Oakland, Calif. The contract calls for detailed engineering design, procurement of equipment and inspection of construction for the huge Volta River hydro-electric project.

The entire project, at an estimated cost of $168 million, was spurred by a consortium of American aluminum producers.

The consortium, Volta Aluminum Co., is headed by Kaiser Aluminum & Chemical Corp. It proposes to build an aluminum reduction plant in Ghana sometime prior to 1965. But first, Ghana must supply power.

A Strong Industry

Machine tool activity continues at an active pace in Britain. Even England's recent auto recession had little effect on tool producers. And now that auto production is again gaining, machine tool industry expects increased sales.

Latest statistical returns show present machine tool orders 86 pct higher than at the same time last year. Orders are currently running at a rate of $300 million.

Big Chilean Loan

The Export-Import Bank of Washington recently signed a $42 million loan pact with a Chilean electric power company.

The loan was made to Chilena de Electricidad, Ltd., Santiago. According to Eximbank, credit will be used to cover dollar costs of U. S. equipment. The equipment is for an expansion and modernization program.

Shipping Challenge: Less Paperwork

A study group appointed two years ago by the Maritime Administration is about ready to report its findings. It has been seeking ways to reduce the "tons of paperwork" used in international shipping.

The group will reportedly propose a simplified standard for shipping documents. It will also call for a universal dictionary of terms. This, it believes, will greatly reduce paperwork.

Why the study?

There are estimates that ships now clearing U. S. ports must use 170 steps of documentation for every ton moved. One vessel recently used 8600 pieces of paper to complete data for one round-trip. On top of this, forms now used are almost the same as in 1799.

HOW YOU CAN PUT TELEVISION TO WORK

A brief report on how to use KIN TEL closed circuit TV systems to cut costs, reduce errors, up efficiency

Today, hundreds of companies are solving a wide variety of business and industrial problems with KIN TEL closed circuit TV systems.

For example:

U. S. Steel uses a KIN TEL system to see inside open hearth furnaces.

The Los Angeles Department of Water and Power uses one for remote viewing of water-level meters.

Convair, Douglas, Lockheed, and Northrop all watch rocket tests with KIN TEL systems.

Westinghouse watches nuclear power reactor tests with one.

American Potash and Chemical monitors conveyor line and warehousing operations with one.

The San Francisco Naval Shipyard uses one to guard against pilferage.

These, and many other KIN TEL customers—both large and small—have discovered a significant fact: *Closed circuit television is no longer a novelty.* It's a proven, practical piece of equipment that, in many instances, pays for itself within a year. It's a modern, money-making piece of equipment that you can use in your business, in your plant, in your operation.

What Is a Kin Tel Closed Circuit TV System?

The basic system manufactured by KIN TEL consists of a rugged yet sensitive camera that is small enough to hold in your hand; a receiver that displays pictures that are twice as sharp as you can get on your home TV set; and a camera control unit that is so automatic the only control you have to touch is the on-off switch.

More Than Likely, Your Business Can Use Such a System.

You can use one to watch events or operations that are tedious, difficult, dangerous, or even impossible for men to watch.

Dependable KIN TEL TV systems see where men cannot survive; withstand tremendous extremes in temperature and pressure; perform both critical and routine jobs inexpensively, faultlessly, safely, tirelessly.

You can use one for data transmission.

All types of visual information–from blueprints to fingerprints to graphs–are transmitted over great distances quickly, accurately. Such systems save money, reduce errors and confusion, speed operations.

You can use one for surveillance work.

KIN TEL cameras scan vast areas; guard valuable equipment and property; never blink, quit, sleep, or make an error; watch many operations at once; transmit all information to a central monitoring point.

You can use one for on-the-job training.

Students study operations viewed by a KIN TEL camera. Such systems permit mass teaching that gives each student an unobstructed view; provide on-the-spot realism; end expensive, disturbing plant tours.

Here's What a Kin Tel System Can Do for Your Business

It can do what it is doing, right now, for hundreds of other firms. It can increase the over-all efficiency of your entire operation. It can help you tighten production and inventory controls, help you better your services to customers and clients. It can reduce errors and confusion and duplication. It can cut costs. It can save you time and money. It can free valuable men from tedious and routine tasks. It can give you the modern tools you need to keep pace in this highly competitive market.

For a more specific analysis of how KIN TEL TV can go to work for you, write direct for catalog 6-103 and the name of your nearest KIN TEL engineering representative.

8 Reasons Why So Many Firms Insist on Kin Tel TV Systems

1. **Reliability.** KIN TEL equipment is designed to keep working, day in and day out. It's the first choice for ICBM and other missile programs that depend on TV, that can't afford to compromise with reliability.

2. **Picture Quality.** Full 650-line resolution provides maximum delineation, essential for qualitative observation of complex operations, and for transmission of printed material.

3. **Automatic Operation.** KIN TEL TV is the only closed circuit system that provides entirely automatic, through-the-lens compensation for light-level changes of several thousand to one.

4. **Sensitivity.** With KIN TEL equipment, the light needed to read this page is enough for sharp, clear pictures; and usable pictures can be provided with less than one foot-candle illumination.

5. **Ease of Installation.** No site preparation is needed, no interacting electrical adjustments are required. All units fit in standard 19-inch racks.

6. **Simplicity of Operation.** With no changes in lens iris to make, the only thing the operator has to know is the location of the on-off switch.

7. **Adaptability.** A complete line of shelf-item system components and a variety of cameras and monitors permit observations of nearly every kind of operation, under all kinds of conditions.

8. **Application Help.** You don't have to waste your money and time on application engineering. At no obligation, KIN TEL's nationwide factory-trained field engineers will determine whether or not a TV system can be put to profitable use in your intended application.

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Guard Against Corrosion

Easy-to-apply chemical coatings protect metal, concrete and wood surfaces. These resin coatings provide effective barriers against capital-shrinking corrosion. They can be applied with rollers, spray guns or brushes. Chemical resistance and toughness of these new coatings increase with aging. A continuous film even resists the small molecules of corrosive gases and liquids.

Controls Quenching Cycle

Automatic quenching presses, at the Dagenham, England, plant of Ford Motor Co., insure distortion-free crown wheels and other gear parts. Each of 10 quench presses has an infrared detector. Radiant energy from a metal part focuses on the lens of each detector. When the reading reaches 1510°F, a mercury contact closes. This initiates the quenching cycle.

Increase Ingot Yield

Exothermic hot tops step up ingot yield from 75-85 pct at a Midwestern steel mill. Slabs of exothermic material, 3 in. thick and 12 in. deep, are clipped to the inside of the ingot molds. The steelmaker is now studying a four-sided exothermic hot top. This would reduce the amount of exothermic material needed in the molds.

Casting Costs Tumble

Permanent molds boost titanium-casting yields by a large margin. Called Impel casting, this new method turns out 40 parts per mold. Casters hope to obtain 100 parts per mold in the near future. The permanent-mold approach reduces mold costs. These costs must be incorporated into the price of cast parts such as pump housings, valve-body fittings and impellers.

How to Reduce Lead Time

Numerical control is gaining a big foothold in many diverse areas of manufacturing. These areas range from small tool and die shops to large aerospace plants. Electronic data-processing systems are working hand in hand with numerically-controlled machine tools. In introducing a new product, this team lops off lead time.

Patch Leaky Drums

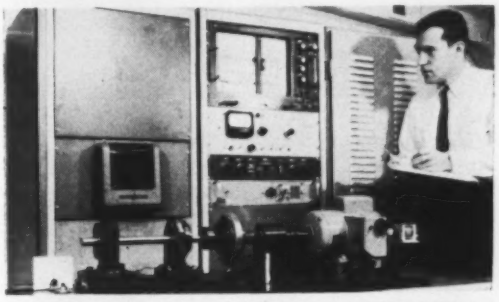
A motor carrier has found a way to keep shipments moving—even when metal drums leak in transit. Using an aluminum-filled epoxy-resin compound, all leaky drums are repaired on the spot. This solves a complex problem. Shippers can't transfer the contents of leaky drums due to the danger of contaminating the contents.

Openhearths: More Oxygen

Preliminary tests, using an 80 pct hot-metal charge with a 50,000 cu ft per hour oxygen input, promise new savings for openhearth operations. Previous practice called for a 50-60 pct hot-metal charge. Oxygen in openhearths is commonly limited to 25,000 cu ft per hour. The new system cuts fuel needs as much as 23 pct. It also reduces heat time by about 15 pct.

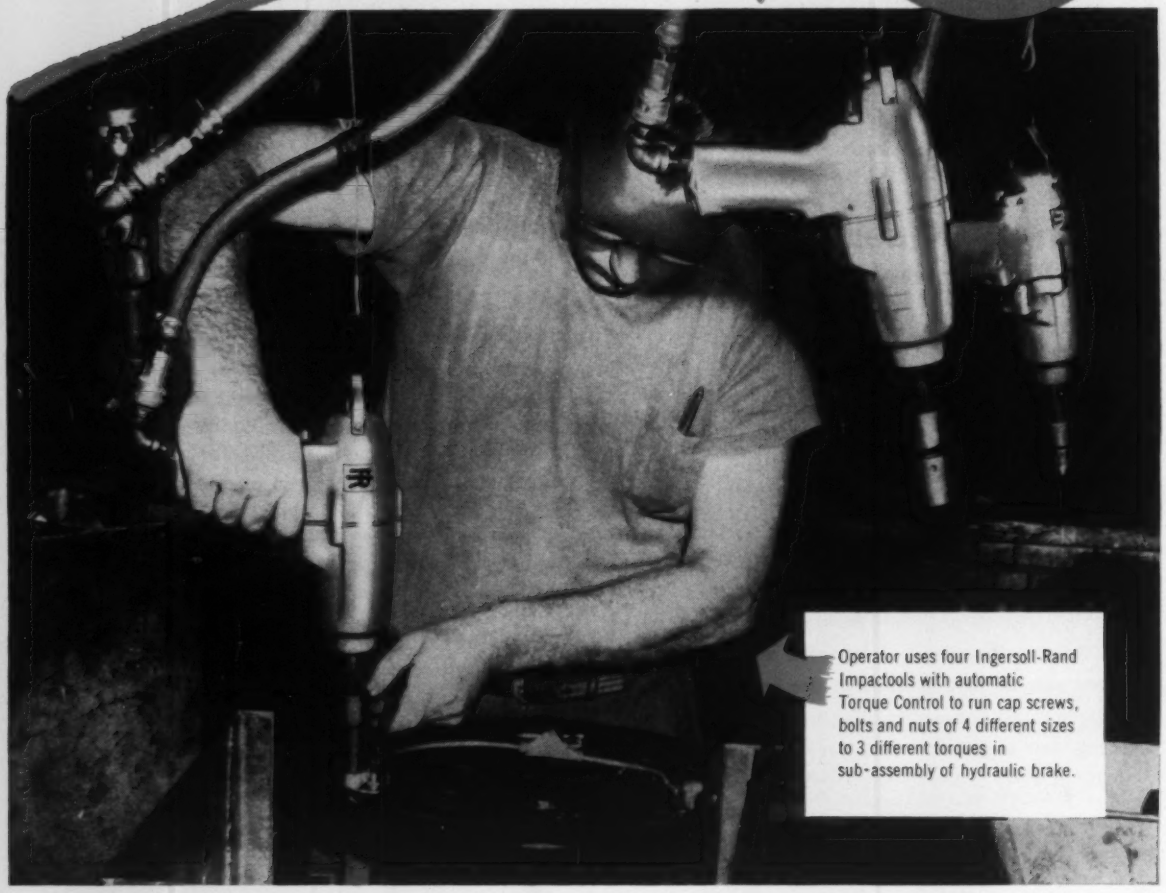
Monitors Bearings

Designed to improve sleeve and shaft bearings, a bearing analyzer "looks" inside an operating bearing and shows designers what's happening. The newcomer tests one or two bearings at a time. Test speeds range from 0-3500 rpm. It's said to be the first system that measures and records a bearing's torque, while eliminating test-setup torque. This system allows engineers to pinpoint the effects of design changes, lubricants and a host of other variables.



BEARING ANALYZER: Plots all variables.

IMPROVE PRODUCT QUALITY PRODUCE 45% MORE AT THE SAME TIME!



Operator uses four Ingersoll-Rand Impactools with automatic Torque Control to run cap screws, bolts and nuts of 4 different sizes to 3 different torques in sub-assembly of hydraulic brake.

By replacing ordinary air and electric impact wrenches with Ingersoll-Rand "automatic shut-off" torque control Impactools, the problem of driving cap screws, nuts and bolts to 3 different and precise torques has been eliminated. Quality is assured!

At the same time . . . production on this job has increased by 34% to 45% per manhour depending on the model being assembled! And . . . this manufacturer has solved his "quality bottleneck" on 11 other operations with additional reliable high-production, Torque Control Impactools.

This extra output means a Dividend on Payroll Dollars for this manufacturer of from 34% to 45% of the operator's wages!

You can calculate your own dividend with the help of Ingersoll-Rand's new, illustrated guide-book, "How to earn a Dividend on Payroll Dollars with Planned Annual Retooling" . . . and handy Dividend Computer. Call your nearby I-R Representative or write Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

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Planned Annual Retooling increases output per man

43A-8

New Roebling Wide Width Tempered Spring Steel makes the most of a good thing

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You count your profits in the number of holes in your scrap. And spring steel that doesn't measure up to the most good parts per inch just isn't the right steel for you.

That's why everybody's talking about new Roebling tempered, cold rolled spring steel. Comes in *any* width up to a full handspan wide. 8⅜ inches, that is, by .005 to .062 inches thick. Think how useful that unique extra width can be in getting extra blanks from a length of steel! The thickness is consistent, too.

Now pick a finish – any finish – blued, straw, or bright – plain or ground, Roebling's got it. Buy Roebling Cold Rolled Spring Steel and you get uniform excellence in temper and finish. Delivery? No problem at all. Get full facts and figures by writing Roebling's Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

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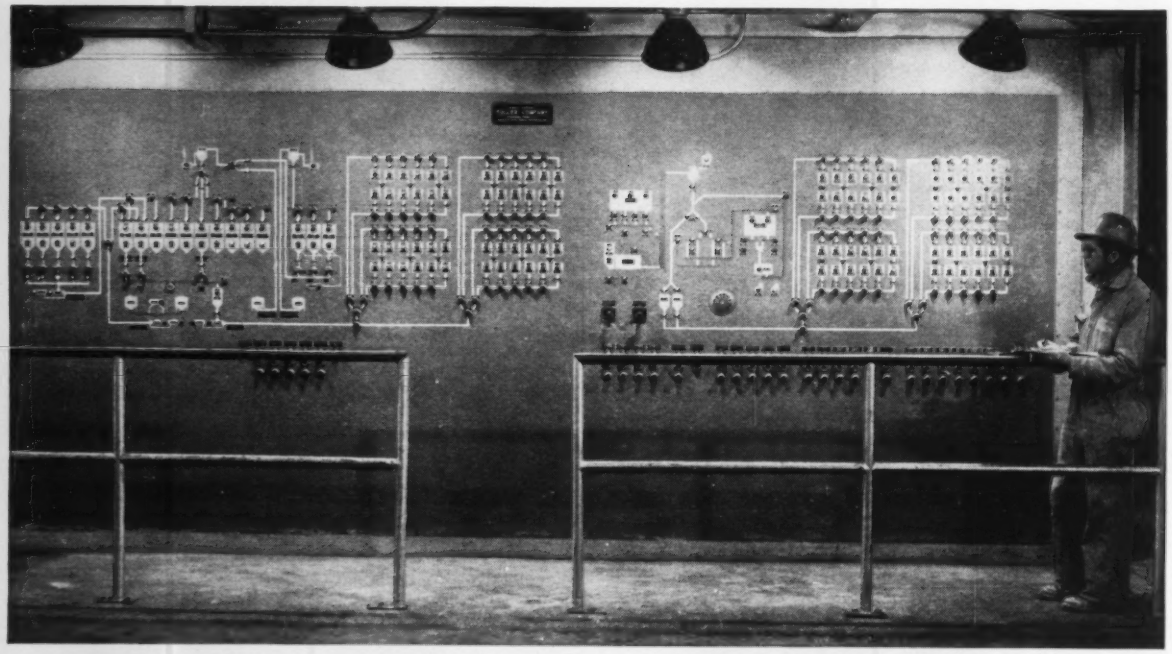
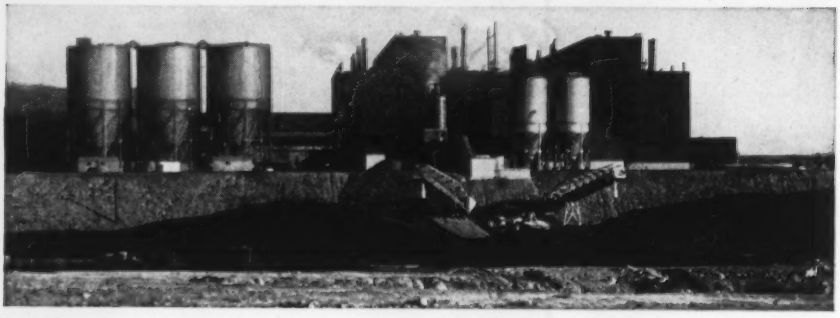
Fuller Control Panels—automatic, remote, one-man control of multiple operations—stem from Fuller's vast materials handling and instrumentation experience. Fuller, the only manufacturer of pneumatic conveying equipment engaged in engineering and building its own control panels, puts its cumulative experience into each project. This single knowledgeable responsibility for both system and control means savings in time and costs. More important—it's your assurance that the total system is generic to your specific operational needs.





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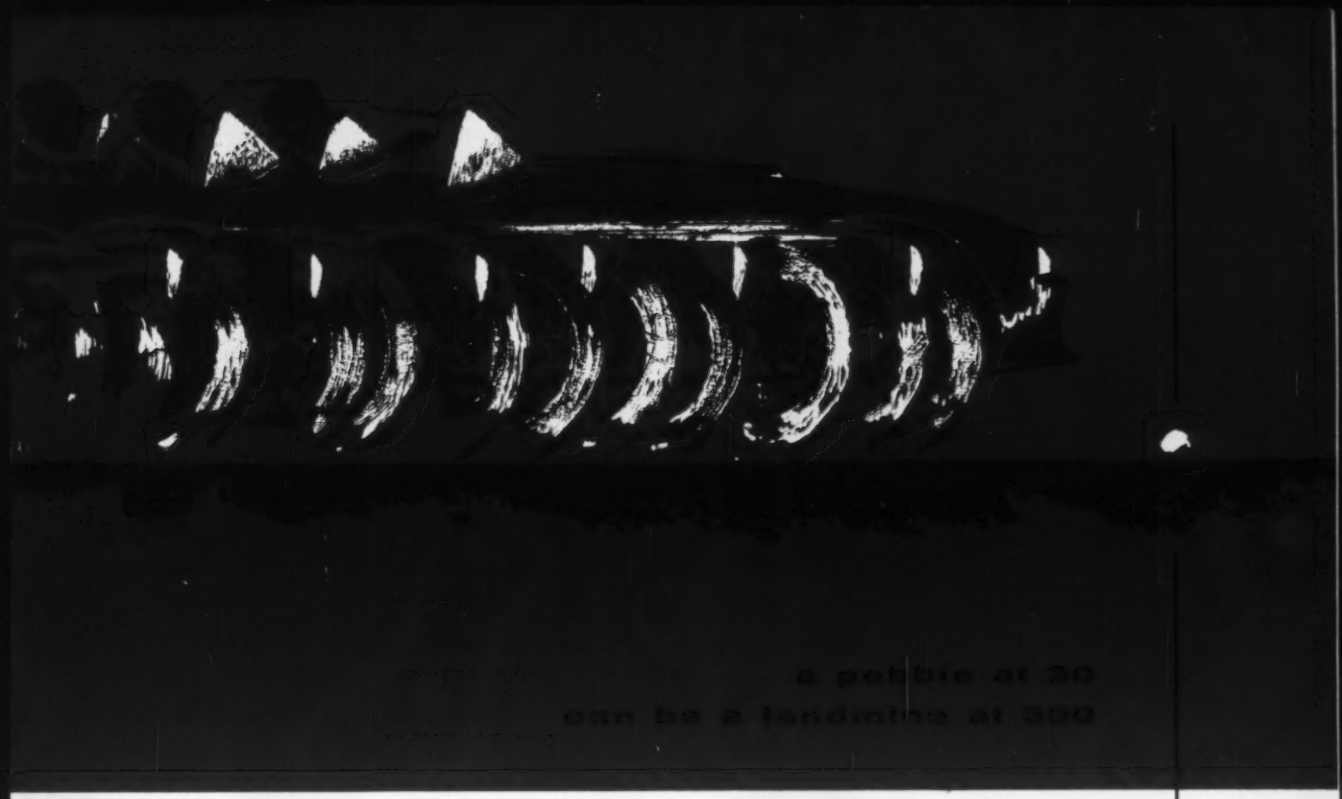

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can be a landmine at 300

the harder you drive for
super speed production
the more you need safe-
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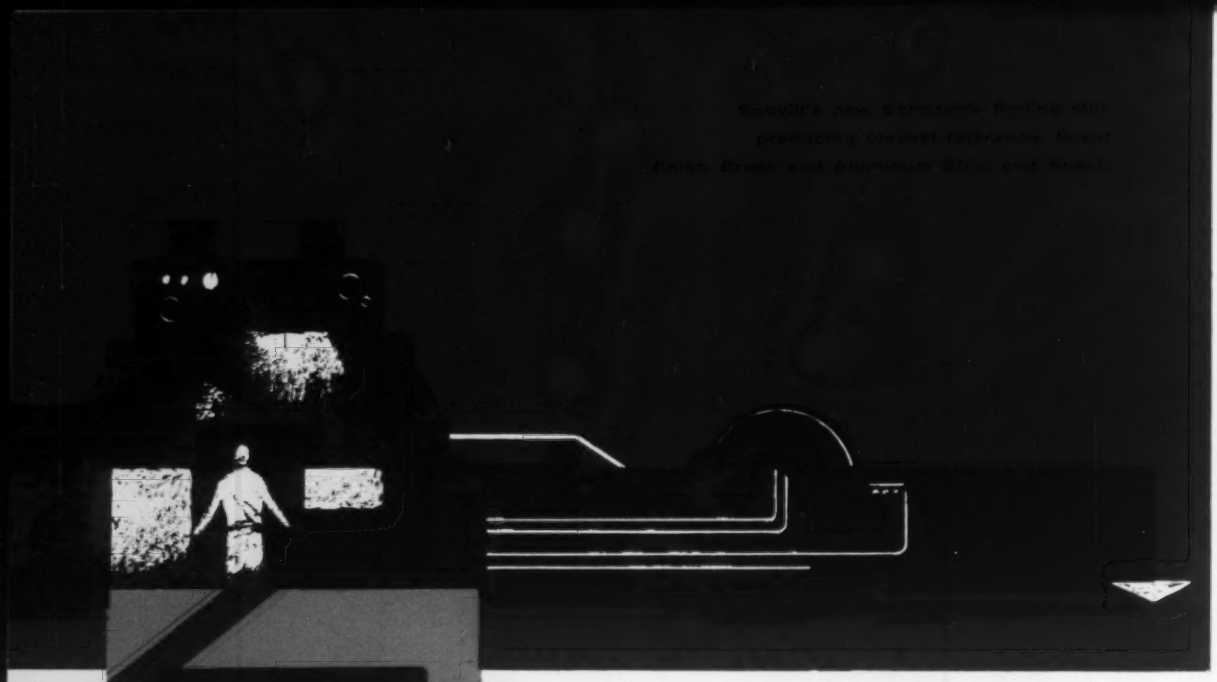

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Metal soundness and uniformity — For more than 20 years, unique Scovill *continuous casting* machines have been supplying a major part of the cast brass bars and billets used to produce strip, sheet, rod, wire and tube . . . over two billion pounds of metal that is inherently sounder and more uniform in every respect. This means fast running capability, minimum down-time and rejects, better quality products.

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Selection of the right alloys — Scovill Metals Research maintains a continuing program of research into the practical needs of mill products fabricators. Scovill's broad range of alloys permits recommendation of exactly the right properties and qualities for a given job.

The industry's most advanced packaging — Packaging of Scovill Brass, Copper and Aluminum Mill Products can make a specific contribution to speed and efficiency in your operations . . . save you handling time and space in storage . . . cut production down-time and start-up. Scovill innovations include extra-long-run coils; Fast-Feed wire packages; easy-to-handle bundling or boxing of rod and tube.

Any fabricator who has made Scovill a part of his competitive team knows that these are only a few examples of the down-to-earth help and service he can depend upon. Call in Scovill NOW . . . especially if you want to get ideas and help in selection of the BEST metal for an important new product.

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. . . and made better to bring out the **BEST** *in your products*

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On Line Managers

The IRON AGE cover story of March 2, "A Program of Executive Self-Development" by Moorhead Wright, operations manager, General Electric Co.'s Management Research and Development Institute, is already drawing hundreds of requests for reprints. Some of the comments follow.—Ed.

"I have read your wonderful article and would like some of my other people to read it."—Samuel Hamelsky, president, Morrison Steel Co., New Brunswick, N. J. "Your article was extremely interesting," Clarence A. Johnson, Chicago, Ill. "It is certainly a stimulating article on one of the shortcomings of modern industry."—D. K. Stuart, assistant to the president, Crucible Steel Co. of America, Pittsburgh, Pa. "It was an item of extreme interest."—H. C. Webster, Continental Can Co., Inc., Paterson, N. J.

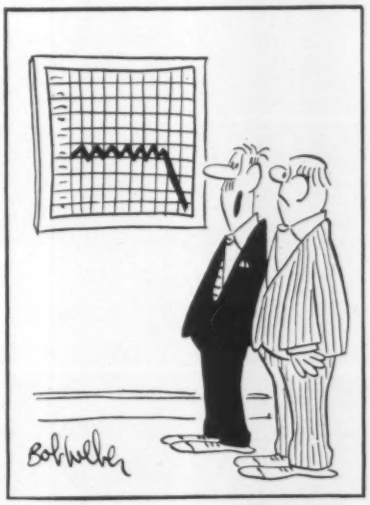
Righteously Indignant

Sir—I have just read your editorial "Righteous Indignation: Whatever Happened to It?" and the article "Are Price Controls Coming?" in a recent issue of The IRON AGE. I heartily agree that the "man in the street" should have "had it!" My own analysis is that unfortunately "men in the street" who are also union members seem to feel that they have to band together and fight management whether it makes sense or not; whether it penalizes even themselves in the long run.

I certainly am no authority in this field but for some time I have held the opinion that incorrect word usage plays an important part. I believe that the accepted definitions of the words "labor" and "management" are at the root of this folly of a man following group thinking even to his own detriment. I have been conducting my own campaign to get people to use terms which I feel give better identification to the separation of "men in the street" and policy-setting groups. Actually there are two policy setting groups: Labor management and industrial management.

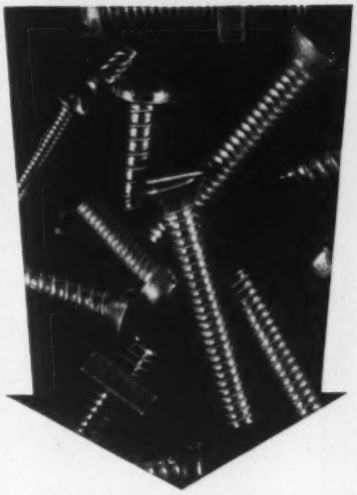
If a lot of emphasis were put on getting people familiar with these two terms, it might help individuals to know that neither side should be fought as a full-time foe—but that either "labor management" or "industrial management" should be fought by all people whenever their "righteous indignation" is aroused by the conduct of either group.

I have long admired your hard-hitting editorials and if you find merit in a progressive campaign on these points, I feel your wide following would go a long way toward getting a lot more individuals to recognize that getting along with group opinions can boomerang when the rights of free men are involved. —Virginia N. Miller, Cleveland, O.



"I was beginning to think we'd never get out of that rut."

For Finest Plated
finishes



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Write for current stock list and quotation on plating the fasteners you need. Over 1,500,000,000 quality fasteners in stock—every one USA-made! Address: Southern Screw Company, P. O. Box 1360, Statesville, N. C.

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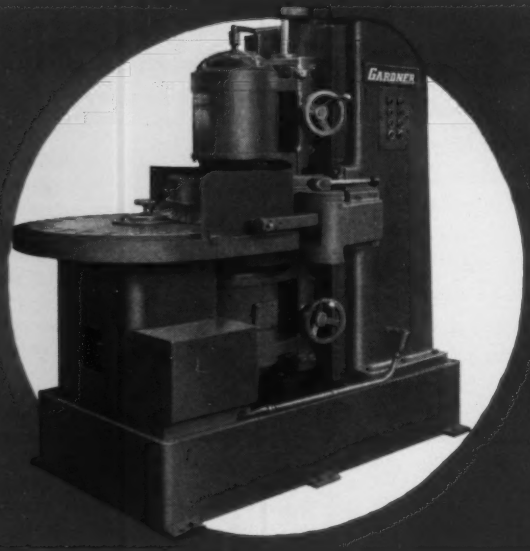
Single Spindle Disc Grinders—For production grinding single surfaces. Manual and power-operated work-carrying fixtures available.

Precision Double Spindle Disc Grinders — Grind TWO parallel surfaces in ONE operation. Rotary, feed thru or gun type work fixturing.



Precision Vertical Double Spindle Disc Grinders— Grind TWO parallel surfaces in ONE operation. Springs and miscellaneous small parts for watches, business machines, electronic applications . . . metallic and non-metallic materials.

Special Purpose Disc Grinders—For parallel surfaces, sequence grinding, generating curved surfaces . . . single or multiple surfaces.

a full line of precision disc grinders for high production, high quality flat surfacing . . .

For information send for Condensed General Catalog

GARDNER

precision disc grinders

BELOIT, WISCONSIN

FATIGUE CRACKS

In the Far East

When you read Tom Campbell's editorial this week (in its traditional position on p. 5) you must have made a mental note that it wasn't written here in the U. S.

Well, it wasn't. Right now, World Traveler Tom Campbell is in Japan accumulating material for a series of stories on Japan and the Far East nation's new industrial strength.

The first of the series will be cabled direct from Tokyo and will appear next week. Some of the subjects: Pressure on World Markets, Raw Materials Problems, Rivalry with Red China.

We're looking forward to the series and suggest that you follow it. Knowing our editor-in-chief's reporting abilities, we are looking for a straightforward, punchy, and informative series.

Exclusive Interviews

In recent issues, you probably noticed stories from Washington based on exclusive interviews with U. S. senators. Our Special Report in the Feb. 16 issue, for example, was based to a large extent on an interview on Defense Dept. waste as seen by Sen. Paul H. Douglas.

Last week, an interview with Sen. Warren Magnuson (D.-Wash.) was the basis of a story speculating on improvements in the U. S. export credit guarantee system.

Both stories were the work of Ralph Crosby, who covers the nation's capital for The IRON AGE.

We thought you might like to get a look at Ralph in action. Here, (on the left) he's interviewing Senator Magnuson in the senator's office.

Sales Orbit

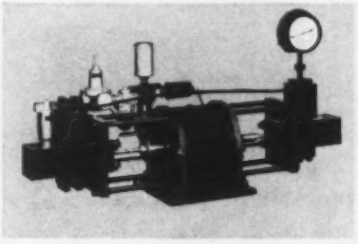
For the ultimate in an international order, we don't think you can top this one.

M. E. Cunningham Co., Pittsburgh, will make a remotely-operated slab and bloom marker for an overseas order. It's been built for a German engineering company; will be installed at a Brazilian steel mill which is owned and operated by a Japanese group.

For more on international news, see p. 13.

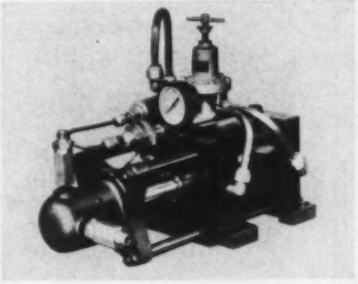
AT THE SCENE: Ralph Crosby, IRON AGE Washington bureau (left), interviews Senator Magnuson in the latter's office. (See details, above.)

Need reliable hydrostatic testing to 50,000 psi?



Ordinary pumps just won't do. To handle fluids at pressures up to 50,000 psi and beyond, it takes the rugged dependability of an Aldrich heavy-duty, 6″ stroke pump. Powerful yet compact, this unit is the right answer for high pressure equipment on production lines or in the laboratory.

Service—hydrostatic testing of tubing, valves, pressure vessels; operation of hydraulic presses, cylinders, valve positioners. Available single or double acting.



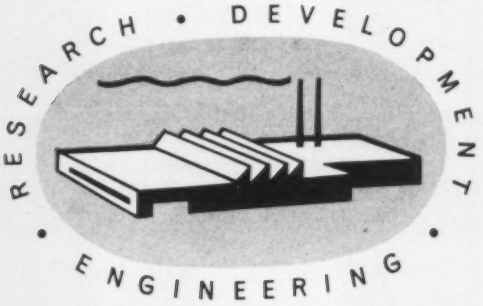
For intermittent service and pressures to 36,500 psi, the Aldrich 3″ stroke pump is ideal, offers low first cost, high reliability.

Both these Aldrich Air-Driven Hydraulic Pumps operate on normal plant air, are readily installed and economical to run. Immediate shipment from factory stock. Write for Data Sheet No. 36 (6″ stroke) and No. 36A (3″ stroke).

ALDRICH

ALDRICH PUMP COMPANY
8 Pine Street, Allentown, Penna.

A new source of help for your manufacturing profits



SIMONIZ INDUSTRIAL PRODUCTS

A Division of Simoniz Company

The same extensive research facilities that have produced the enviable chemistry of Simoniz products for over fifty years now have developments of significance to industry. The best of these are being made available through the new Industrial Products Division of Simoniz Company—Now, these better methods and materials can help you increase sales and reduce costs . . . Now, this complete facility for research and engineering is available to develop new materials for your specific needs. *Call or write for details of CLAD-REX Vinyl-Clad Metals . . . SIMONAIRE Foams and Industrial Chemicals . . . Simoniz Research, Development and Engineering.*

Address all inquiries to Simoniz Industrial Products
11500 West King Street, Franklin Park, Illinois
GLadstone 1-2323

COMING EXHIBITS

Western Metal Show—March 20-24, Pan Pacific Auditorium, Los Angeles, (American Society for Metals, Metals Park, Novelty, O.)

National Packaging Show — April 10-13, Lakefront Exposition Hall, Chicago. (American Management Assn., 1515 Broadway, Times Square, New York 36.)

Welding Show—April 17-21, New York Coliseum, New York. (The American Welding Society, 33 West 39th St., New York 18.)

Powder Metallurgy Show — April 24-26, Hotel Sheraton - Cleveland, Cleveland. (Metal Powder Industries Federation, 60 E. 42nd St., New York.)

Castings Show—May 8-12, Brooks Hall, San Francisco, Calif. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Design Engineering Show — May 22-25, Cobo Hall, Detroit. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

MEETINGS

MARCH

Industrial Diamond Assn. of America, Inc.—Annual meeting and convention, Mar. 13 - 17, Hollywood Beach Hotel, Hollywood, Fla. Association headquarters, Box 175, Pompton Plains, N. J.

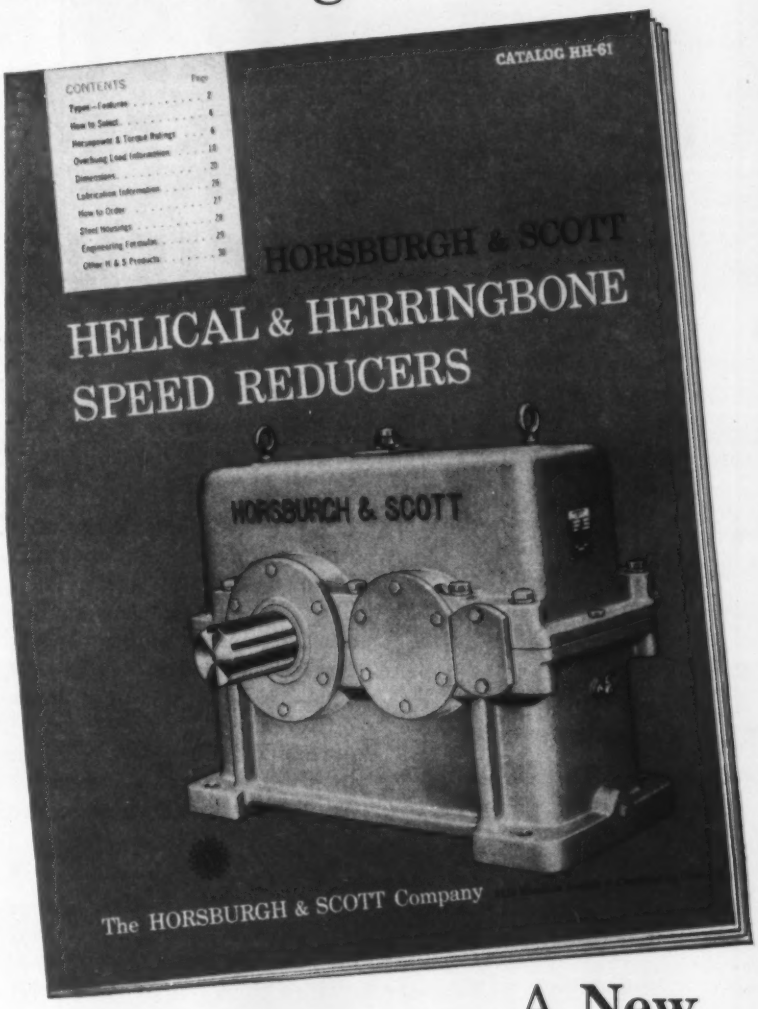
Society for Non-Destructive Testing — Western regional convention, Mar. 20-24, Ambassador Hotel, Los Angeles. Society headquarters, 1109 Hinman St., Evanston, Ill.

American Hot Dip Galvanizers Assn., Inc.—Annual meeting, Mar. 22-24, The Royal Orleans, New Orleans. Association headquarters, 5225 Manning Place, N. W., Washington, D. C.

Pressed Metal Institute — Spring technical meeting, Mar. 22-24, New York. Institute headquarters, 3673 Lee Rd., Cleveland.

(Continued on P. 26)

Introducing . . .



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HORSBURGH & SCOTT
SPEED REDUCER CATALOG

To Simplify Selection of Speed Reducers for Industry

New catalog features include:

New Sizes • Improved Ratings • More Ratios • Latest AGMA Thermal Ratings • Simplified Selection • Easy-to-use Overhung Load Ratings • Steel Housings.

Write for **Catalog HH-61**—on your company letterhead, please.

Let our engineering staff give you prompt assistance with your enclosed gearing requirements.

The HORSBURGH & SCOTT Co.
5112 Hamilton Avenue • Cleveland 14, Ohio

JF SERIES

EASY SAFE EFFICIENT LIFTING!

IT'S EASY to raise or lower loads while pulling a trolley mounted Coffing Quik-Lift Electric Hoist. The pistol-grip control station and the combination strain cable and control cord makes this possible. The light but strong aluminum housing provides ease of portability. Changing voltages, limit switch, type of suspension or chain is quick because the housing is in sections.

FOR SAFETY the control station is made of non-conducting plastic in which the voltage is reduced to 115 volts and the push-buttons are interlocked. The V-type brake which provides maximum braking surface and positive control of loads is another safety measure.

FOR EFFICIENCY this hoist has been designed to bring heavy-duty performance plus durability to the portable hoist field. It will pay you to specify Coffing Quik-Lift. Twenty models—capacities range from ¼ to 2 tons. Ask your distributor for details or write for Bulletin ADH-65.

COFFING HOISTS

DUFF-NORTON COMPANY

Four Gateway Center · Pittsburgh 22, Pa.

COFFING HOISTS
Ratchet Lever • Air
Hand Chain • Electric

DUFF-NORTON

DUFF-NORTON JACKS
Ratchet • Screw
Hydraulic • Worm Gear

MEETINGS

(Continued from P. 25)

Air Moving and Conditioning Assn., Inc.—Mid-year meeting, Mar. 22-24, Whittier Hotel, Detroit. Association headquarters, 2159 Guardian Bldg., Detroit.

American Machine Tool Distributors Assn. — Spring meeting, Mar. 23-25, Hotel Mark Hopkins, San Francisco. Association headquarters, 1500 Massachusetts Ave., N. W., Washington, D. C.

APRIL

The Metallurgical Society of AIME —National Openhearth Steel Conference, Apr. 10-12, Sheraton Hotel, Philadelphia. Society headquarters, 29 West 39th St., New York.

American Institute of Electrical Engineers — Biennial conferences on electric heating, Apr. 11-12, Sheraton-Lincoln Hotel, Indianapolis, Ind. Institute headquarters, 33 W. 39th St., New York.

Steel Shipping Container Institute, Inc.—Annual meeting, Apr. 11-13, Kenilworth Hotel, Miami Beach, Fla. Institute headquarters, 600 Fifth Ave., New York.

American Society of Lubrication Engineers — Annual meeting and exhibit, Apr. 11-13, Bellevue-Stratford, Philadelphia. Society headquarters, 5 N. Wabash Ave., Chicago.

Copper & Brass Warehouse Assn., Inc.—Annual meeting, Apr. 11-14, Colorado Springs, Colo. Association headquarters, 1900 Arch St., Philadelphia.

Rail Steel Bar Assn. — Annual meeting, Apr. 17-18, Biltmore Hotel, New York. Association headquarters, 38 S. Dearborn St., Chicago.

American Welding Society—Annual meeting, Apr. 17-21, Commodore Hotel, New York. Society headquarters, 33 W. 39th St., New York 18, N. Y.

Ore importers... save money via Portland (Oregon) Harbor

Terrific savings by faster discharging of ores and ore concentrates await importers . . . on completion of Portland Public Docks' giant new bulk unloader later this year.

Geared for direct transfer from ship to rail or truck, this straight-line bulk unloader has a rated capacity of 900 tons-an-hour.

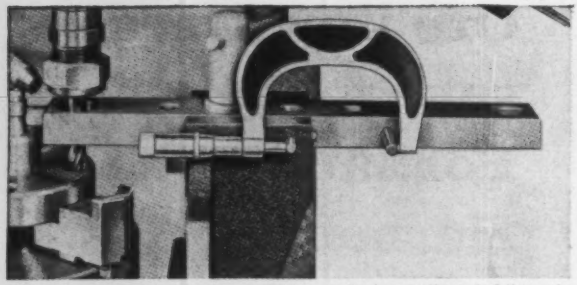
The facility will be the only one of its kind on the entire Pacific Coast.

PORTLAND PUBLIC DOCKS

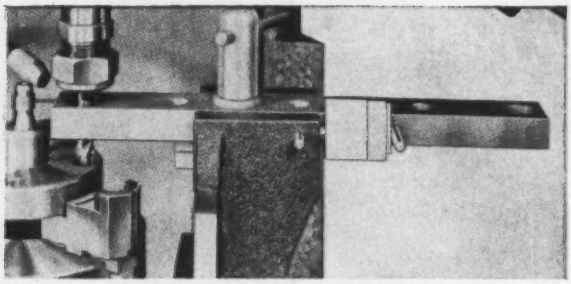
operated by the Commission of Public Docks
3070 N. W. Front Ave., Portland 10, Ore. TWX PD309U

Eastern Representative:
Buckley & Co., 170 Broadway New York 38, N. Y.

ORE IMPORTERS TAKE NOTE!
For detailed information on how Portland Harbor's new bulk unloader can cut your importing costs write: Sales-Traffic Department, Portland Public Docks



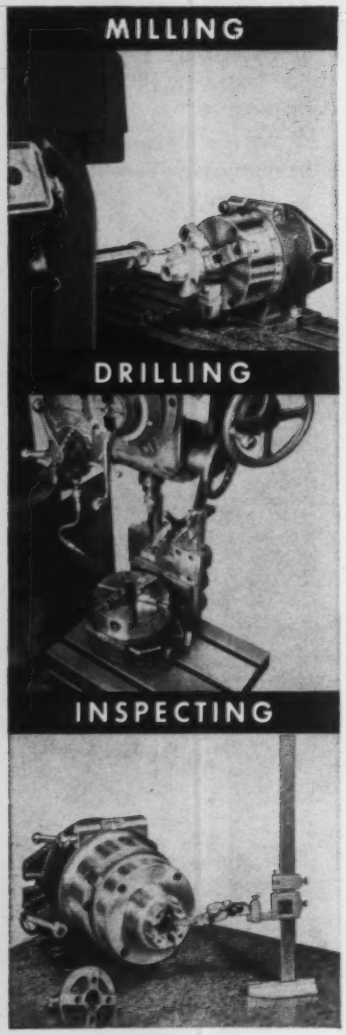
With the vertical drilling attachment, drilling can be done on the end of the workpiece. After aligning the ERICKSON master spacer with the machine spindle, the sliding bar on the attachment is located to the desired accuracy and locked. A direct over-pins micrometer reading gives the distance from master-spacer centerline to center of a drill bushing on the sliding bar.



The machine spindle is then aligned with the drill bushing and machining operations are performed. In the photograph, the drill bushing has been removed for a counterboring operation. Jo blocks were used for extreme accuracy in this setup. A horizontal drilling attachment is available for locating holes (with the same accuracy) on the side of the workpiece.

Micrometer or Jo-block adjustment of drilling attachments bypasses fixture cost and lead time

Get into production fast...with an ERICKSON MASTER SPACER



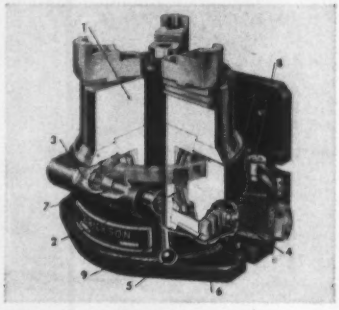
Here is a rotary positioning device as accurate as a jig or fixture, yet rugged enough for straddle milling! With the ERICKSON master spacer, you receive guaranteed radial accuracy of 0.001 in. cumulative error on a 6-in. diameter circle.

In many cases, the ERICKSON master spacer will eliminate the need for expensive jigs and fixtures. It holds highest accuracy under heavy cuts, interrupted cutting, side thrust, or torque loads. Use it when milling, shaping, drilling, boring, or grinding.

The ERICKSON master spacer mounts either horizontally or vertically, so it can be used for machining either the side or the end of the work. For holes on a bolt circle, location is determined by the master spacer and the drilling attachment, and is not dependent upon machine accuracy. The attachment can be set with either a micrometer or with Jo blocks—giving you just the accuracy you need for your job. You can forget drill jigs if you have an ERICKSON master spacer.

Timken-Bearing Spindle Gives Rigidity and Accuracy

THE **ONLY** MASTER SPACER WITH TIMKEN BEARINGS! Three-jaw 6-in. chuck (1) holds work firmly and centers it. Completely sealed Timken bearings (2) assure highest accuracy during indexing. Adjustable zero plate (3)—beveled for easy read-off—locates index points. Hardened index plunger (4) wedge-locks precision hardened and ground 24-position index plate (5)—has zero backlash. Changeable masking plate (6) speeds indexing in production work. Brake shoes (7) are full floating—work can be set up, then **clamped without affecting perfect alignment.** Brake protects index plate and plunger from torque stresses. Index plunger lever (8) and brake lever (9) are spaced for easy one-hand operation.



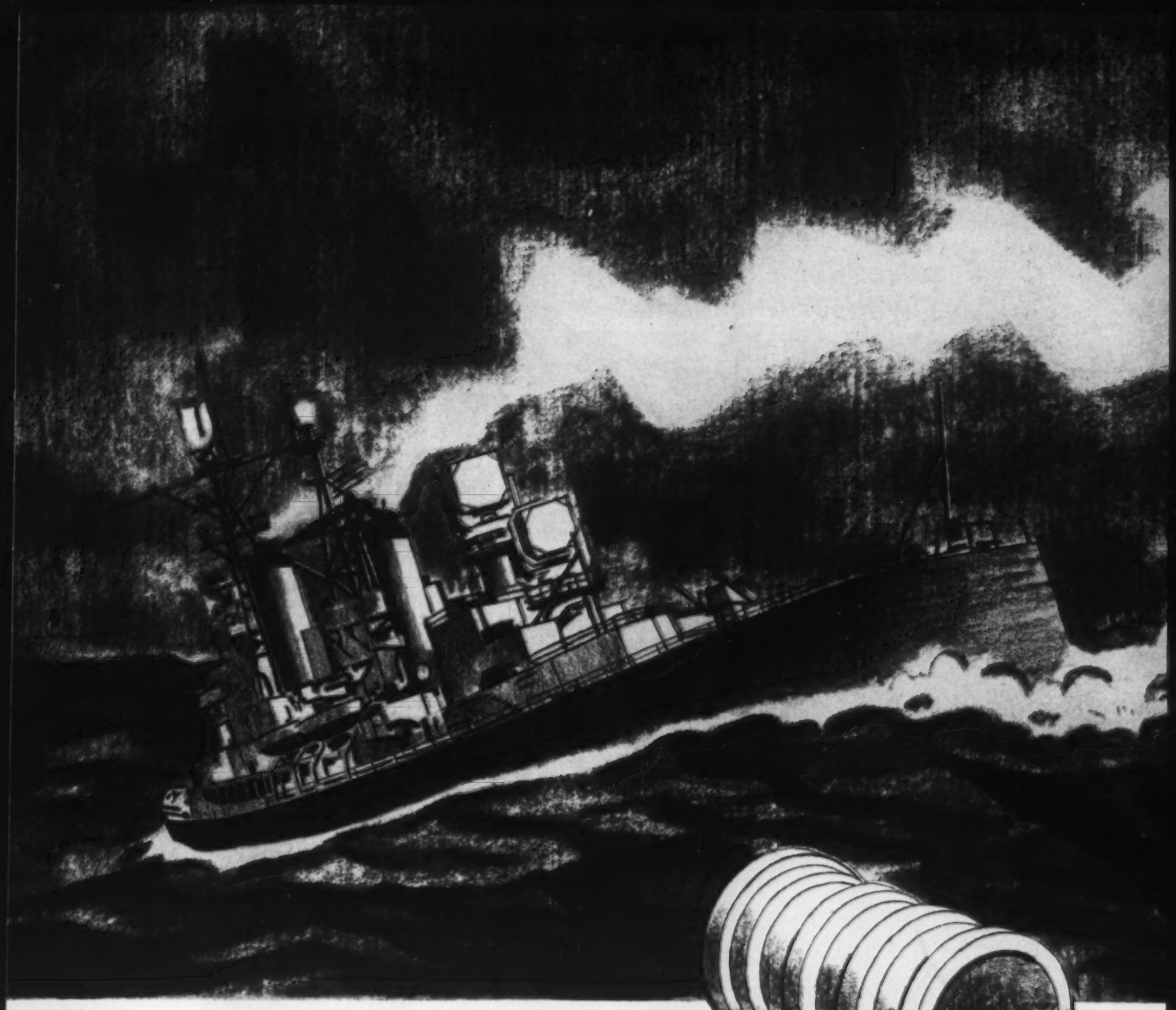
SEND FOR COMPLETE MANUAL

The manual on the ERICKSON master spacer gives the complete story, including construction details, dimensions, and how the vertical and horizontal drilling attachments are set up and used. Six full pages of solid tooling data—yours for the asking.

ERICKSON TOOL COMPANY

34356 SOLON ROAD • SOLON, OHIO

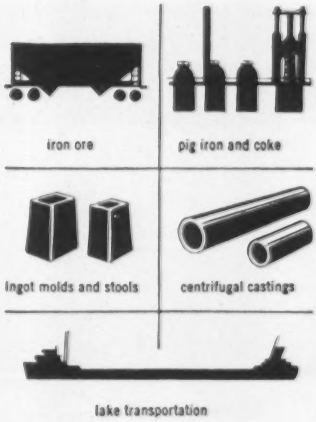
(Greater Cleveland)



When cylindrical parts are vital it pays to specify Shenango Centrifugal Castings

The stern tube bushing for a fast new Naval vessel illustrated here is one good example of the critical engine parts which are centrifugally cast in Shenango's big foundry and precisely finished in its extensive machine shops. Ferrous or non-ferrous sleeves, bearings, rings or rolls are cleaner, denser and more uniform when they are cast by spinning and they enjoy longer life. And because of Shenango's large capacity and experienced staff your biggest and most complex orders will be handled quickly and exactly to specification. Write for literature.

THIS IS SHENANGO!



CENTRIFUGAL CASTING DIVISION

the Shenango FURNACE COMPANY

DOVER, OHIO

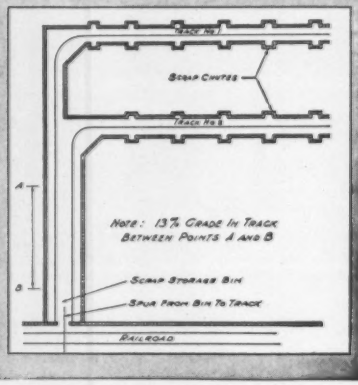
Copper, Tin, Lead, Zinc Bronzes • Aluminum and Manganese Bronzes • Monel Metal • Ni-Resist • Meehanite Metal • Ductile Iron

Automatic Steel Scrap Disposal System

Removes Chips and Shavings Without Attendants

View of tracks near beginning of tunnels. Carrier is shown approaching track incline on way to bin with a load.

A load of scrap about to be dropped in bin. Carrier immediately reverses after unloading and starts another trip.



ONE carload of metal chips and shavings is picked up and moved daily with an automatic Cleveland Tramrail magnet-carrying system that operates unattended in two parallel tunnels under metal-working machines.

Each tunnel has its own Tramrail track on which a magnet carrier travels back and forth, picking up scrap that comes down from the machines on floor above. The scrap is conveyed to a bin next to a railroad siding. The system was put into operation in 1942 and has proven an extremely efficient and low-cost method for ferrous scrap disposal.

GET THIS SPECIAL REPORT
Write us for your free copy of "AUTOMATIC DISPATCH PORTFOLIO" Gives data on a variety of cost-reducing automatic handling installations.

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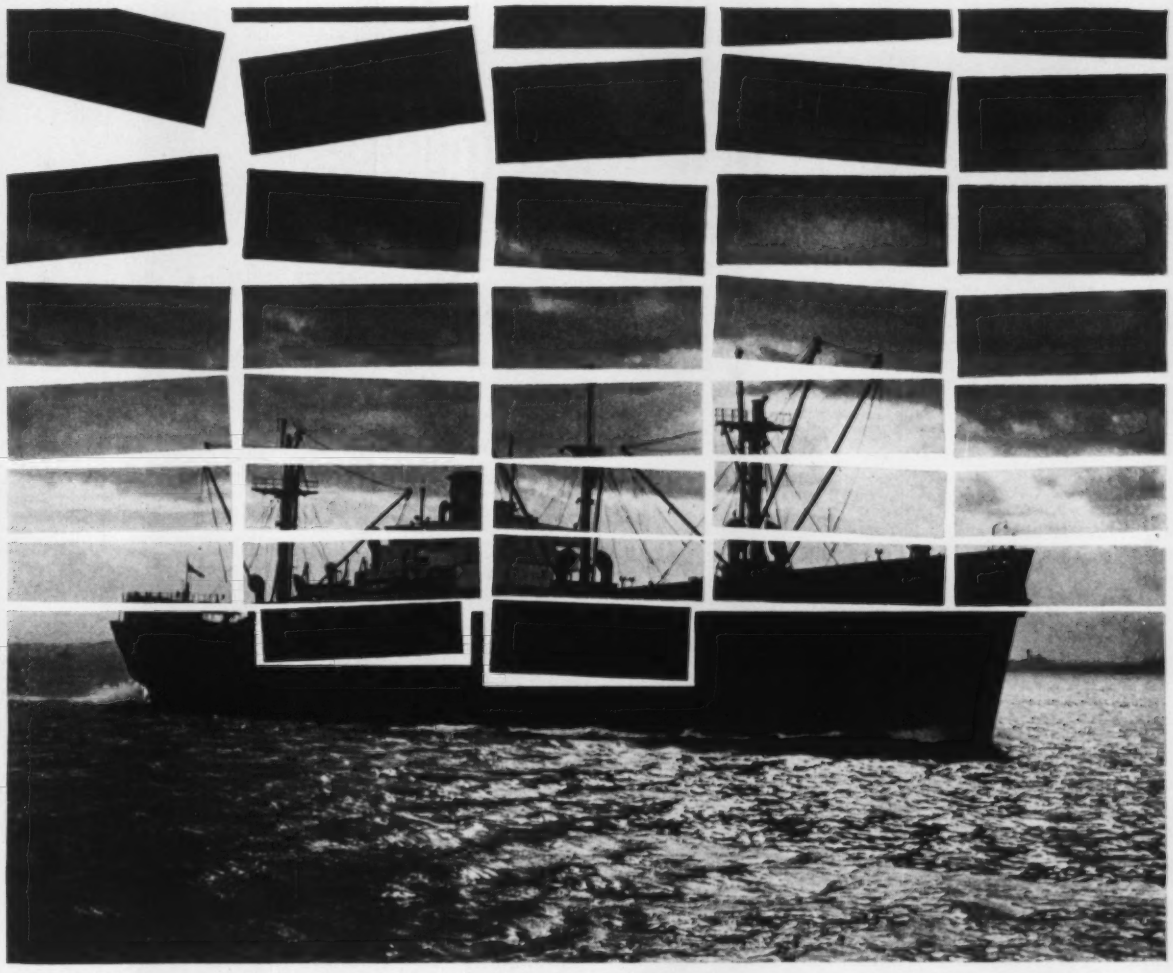
THE CLEVELAND CRANE & ENGINEERING CO.
4885 E. 284th ST., WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT



For New York Shipbuilding Corporation,

CORO-GARD® 1706 STOPS PICKLING TANK LEAKS, PUTS PROTECTION ANSWERS IN PLACE!

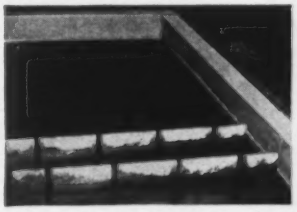
BRAND COATING

New York Shipbuilding Corporation, Camden, N.J., formerly had to repair pickling tank leaks every 4 to 6 weeks. A 15% sulphuric acid solution penetrated the coating then used—caused tank corrosion and leaks. Now, all exposed tank surfaces are protected by CORO-GARD 1706 Brand Coating, and *no leaks have occurred during more than a year's constant contact with the acid solution!*

CORO-GARD 1706 Coating also withstands such corrosive fluids as hydrochloric acid solutions, distilled and salt water, and alkalies, even at continuous heat up to 120°F. It resists attacks by weather, ozone, oxygen and many industrial atmospheres—wards off erosive attack by abrasive-laden liquids. CORO-GARD 1706 Coating is easily applied by brush to unprimed steel, aluminum, copper, galvanized steel, concrete, wood and some plastics. It air-cures to a tough, rubbery protective film.

What can CORO-GARD 1706 protect for you? Call the nearby 3M Field Engineer for technical assistance and information. He can also provide detailed data about hundreds of other 3M adhesive, coating and sealer formulations created to solve specialized problems in protection and fastening. Or write AC&S Division, 3M Co., Dept. SBQ-31, St. Paul 6, Minn.

"CORO-GARD" is a reg. TM of 3M Co.



Pickling tank protected with CORO-GARD 1706 Coating experienced no corrosion, no leaks after more than a year's exposure to 15% solution of sulphuric acid.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

NEW SUPER-TOUGH ORE HAULER USES

N-A-XTRA

HIGH-STRENGTH STEEL TO CUT DEAD WEIGHT AND STRETCH PAYLOAD CAPACITY

This Lectra Haul M-55, made by Unit Rig and Equipment Co. of Tulsa, is now working in the open pit iron mines in Minnesota's Mesabi range. In bone-freezing —40° weather, it can stand up to the shuddering shock of 55 tons of drop-loaded iron ore, climb a 6% grade at 8.6 mph then dump those 55 tons in a crashing, grinding 18 seconds. The quarry body that takes this loading impact and dumping abrasion in sub-zero temperatures is made of N-A-XTRA high-strength steel, with X-A-R Abrasion Resistant Steel for extra hardness and toughness in wear areas. N-A-XTRA also forms the structural members of the complete unit.

Why N-A-XTRA? Because, pound for pound, it's nearly three times stronger than ordinary steel. That means it's strong enough to absorb severe punishment without constant maintenance, and light enough to handle the highest possible payload. In fact, the Lectra Haul payload is almost as much as the net vehicle weight itself.

N-A-XTRA and X-A-R are doing the job where only the strongest steels will do. Easily formed and welded, they are making products stronger, lighter, longer lasting. N-A-XTRA fully quenched and tempered steel is available in four levels of minimum yield strengths, from 80,000 to 110,000 psi. X-A-R steels are supplied in hardnesses from 360 to 400 BHN (or, by agreement, in a range between 265 and 500 Brinell). For full technical information, write Great Lakes Steel Corporation, Product Development, Dept. IA-1, P.O. Box 7310, Detroit 2, Michigan.

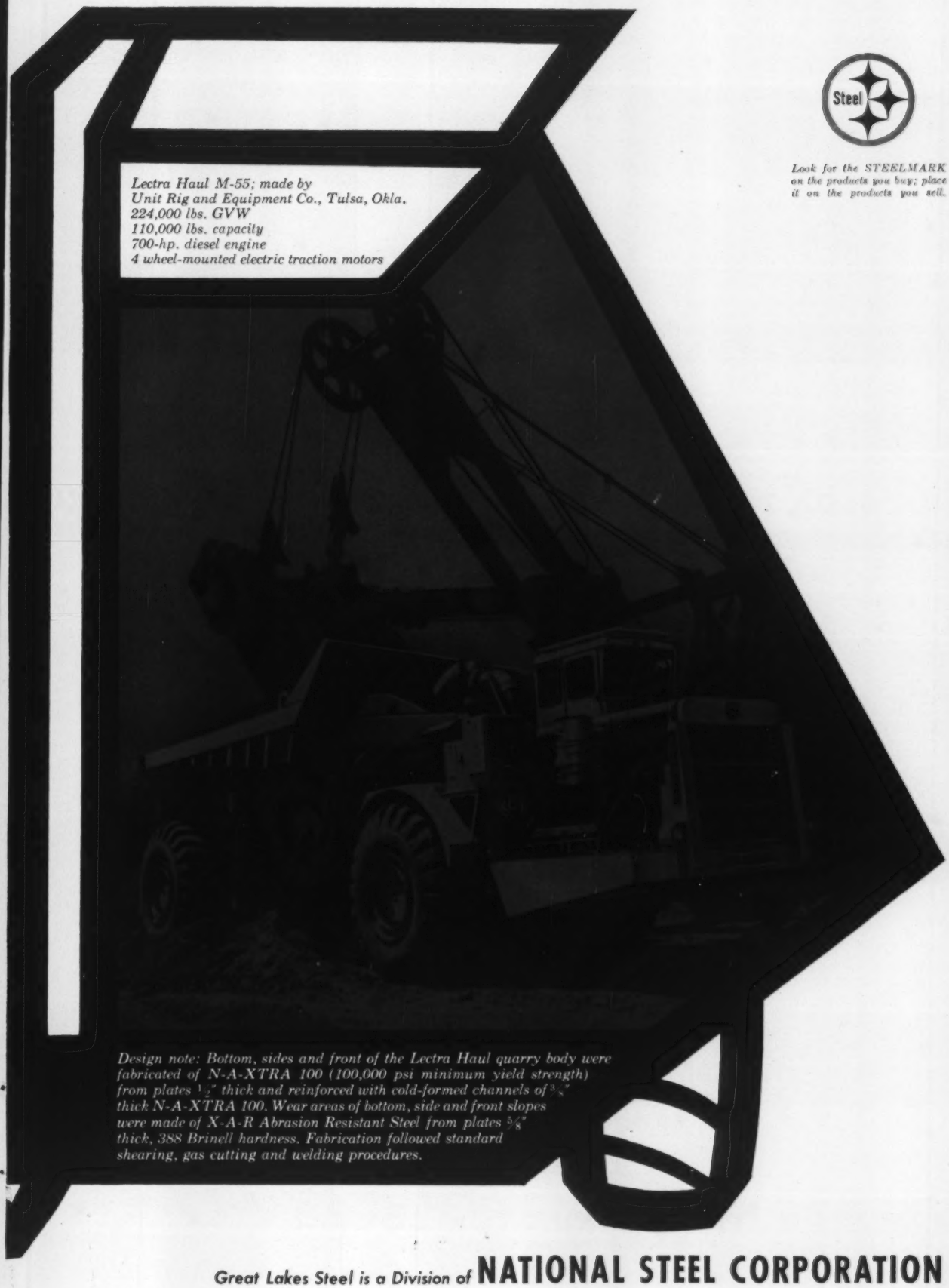
A PRODUCT OF

GREAT LAKES STEEL

Detroit 29, Michigan

N-A-XTRA AND X-A-R STEELS ARE AVAILABLE AT THESE STEEL SERVICE CENTERS

Benedict-Miller, Inc. Lyndhurst, New Jersey	Joseph Demsey Co. Cleveland, Ohio	Ducommun Metals & Supply Co. Los Angeles, California
Interstate Steel Co. Evanston, Illinois	Lockhart Iron & Steel Co. Pittsburgh, Pennsylvania	Marsh Steel & Aluminum Co. Kansas City, Missouri
O'Neal Steel, Inc. Birmingham, Alabama	Salt Lake Hardware Co. Salt Lake City, Utah	A. C. Leslie & Company, Ltd. Montreal, Canada


Lectra Haul M-55; made by
Unit Rig and Equipment Co., Tulsa, Okla.
224,000 lbs. GVW
110,000 lbs. capacity
700-hp. diesel engine
4 wheel-mounted electric traction motors

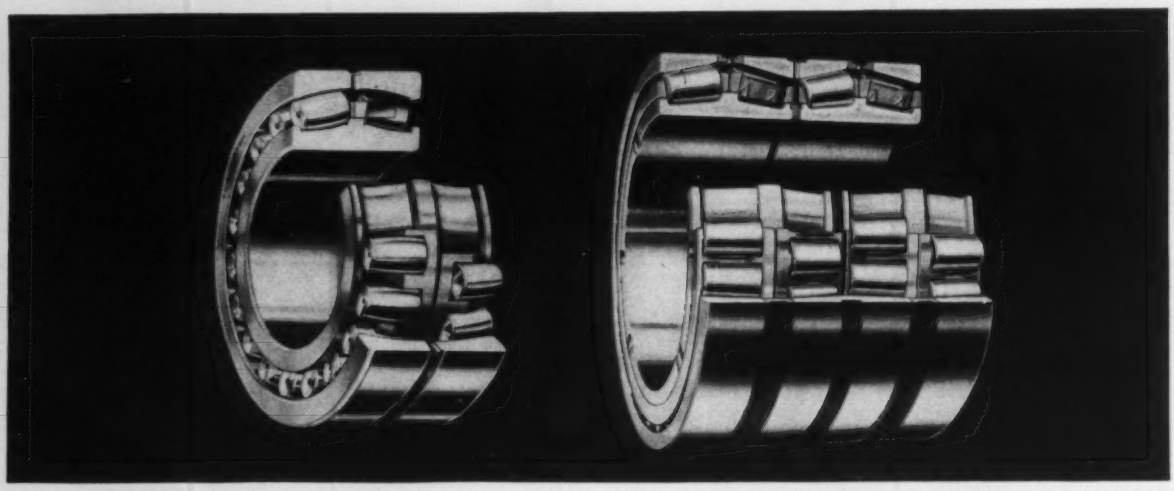
Steel

Look for the STEELMARK on the products you buy; place it on the products you sell.

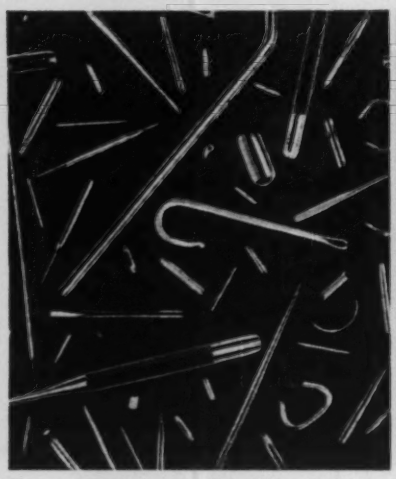
Design note: Bottom, sides and front of the Lectra Haul quarry body were fabricated of N-A-XTRA 100 (100,000 psi minimum yield strength) from plates ½" thick and reinforced with cold-formed channels of ⅜" thick N-A-XTRA 100. Wear areas of bottom, side and front slopes were made of X-A-R Abrasion Resistant Steel from plates ⅝" thick, 388 Brinell hardness. Fabrication followed standard shearing, gas cutting and welding procedures.

Great Lakes Steel is a Division of **NATIONAL STEEL CORPORATION**

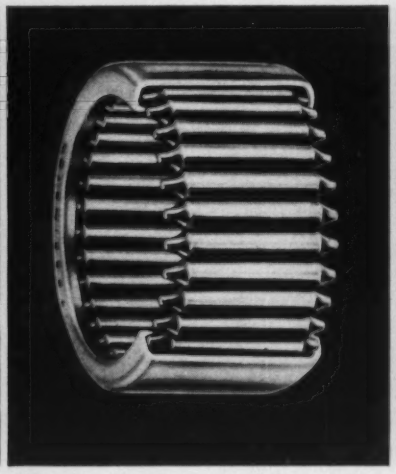
YES, TORRINGTON IS A LEADING MANUFACTURER OF LARGE ANTI-FRICTION BEARINGS...



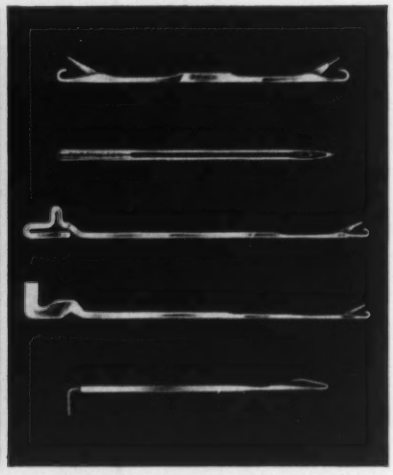
BUT THIS, TOO, IS TORRINGTON...



Foremost producer of small precision metal parts, manufactured by the millions to meet the mass demands of a variety of industries.



Pioneer manufacturer of the revolutionary needle bearings now used in countless products, from aircraft to home appliances.



America's largest manufacturer of machine needles for knitting, sewing, tufting and felting... and a leading producer of surgeons needles.

In these and many other fields throughout the world Torrington is contributing to

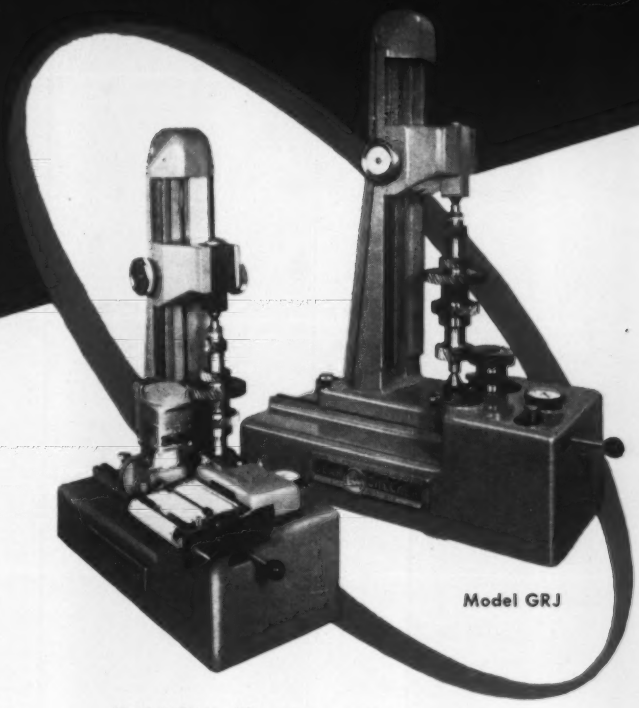
PROGRESS THROUGH PRECISION

THE TORRINGTON COMPANY

Torrington, Connecticut

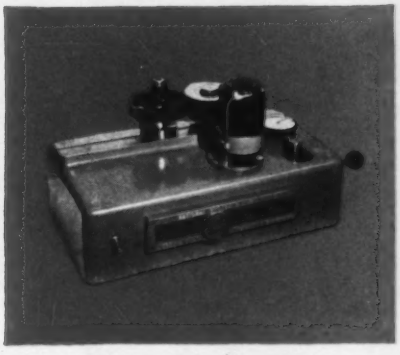
Serving industry from plants located in the United States, Canada, England, Germany and Italy

NEW RED RING Gear Rolling Fixtures



Model GRJ

Model GRJ with motor drive and recorder



Model GRH with motor drive

These Red Ring Rolling Fixtures furnish a quick composite check of gear errors such as runout, tooth spacing, tooth profile, helix angle and tooth surface roughness. Model GRH is used for flat gears, Model GRJ for either flat gears or those having integral shafts.

Either model may be equipped with a constant-speed motor drive to eliminate the factor of non-uniform manual operation.

The motorized fixtures may also be equipped with a tape recorder for permanent inspection records.

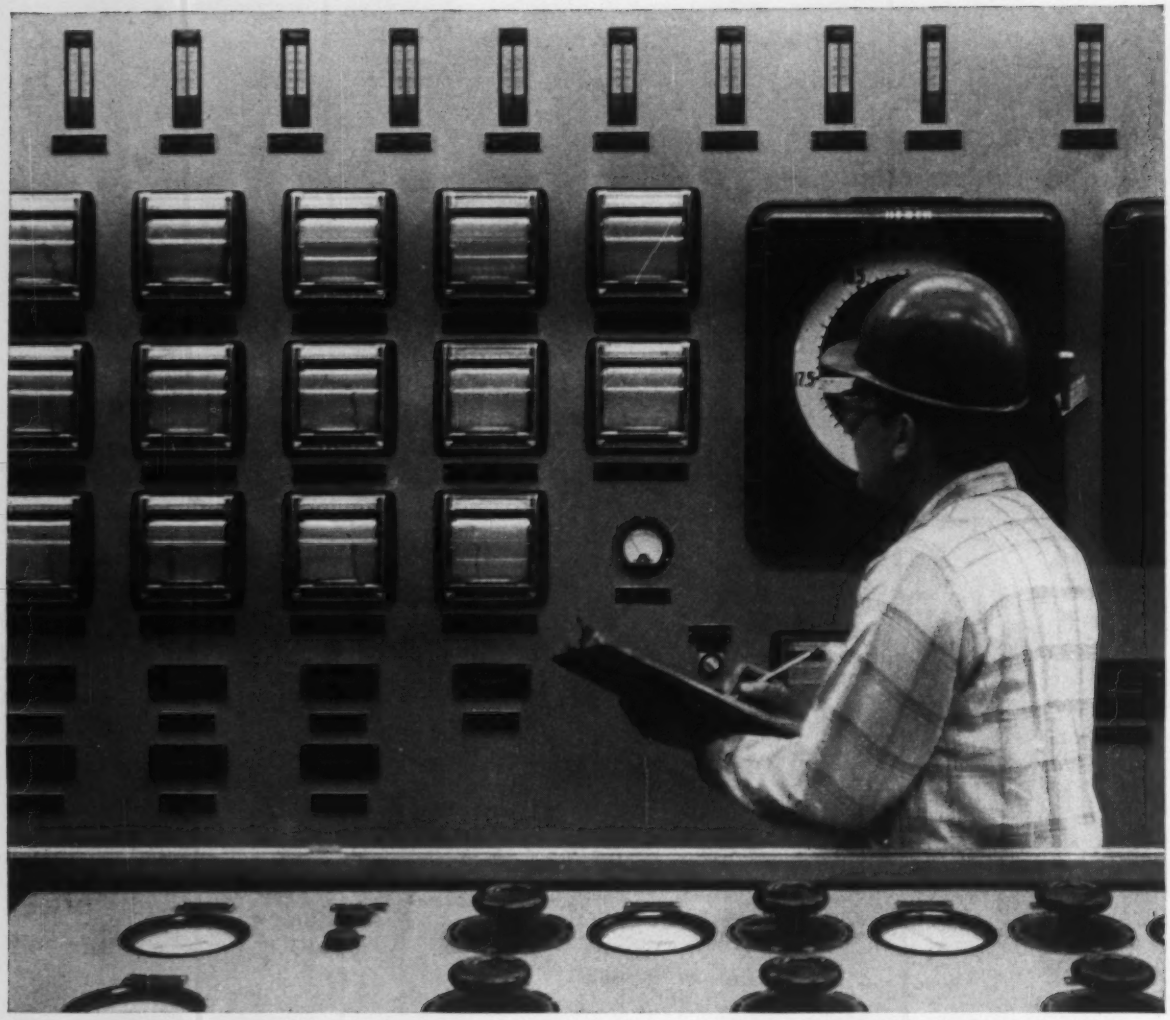
For further information ask for Bulletin C 60-8

SPUR AND HELICAL GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING,
GEAR HONING AND ELLIPTOID

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN • DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING AND HONING EQUIPMENT



Foxboro control panel on Dwight-Lloyd Sintering machine at U. S. Steel's South Works, Chicago. Variables recorded by Foxboro Consotrols include temperature, pressure, level, flow and weight. Plant was designed and built by McDowell Company, Inc., Cleveland.

It's Foxboro "small-case" Consotrols for new U.S. Steel Sintering Plant

Savings in panel space — and in control room construction costs — were both achieved at U. S. Steel when they installed Foxboro "small-case" Consotrol* instruments for their new 5000 ton-a-day sintering machine at South Works.

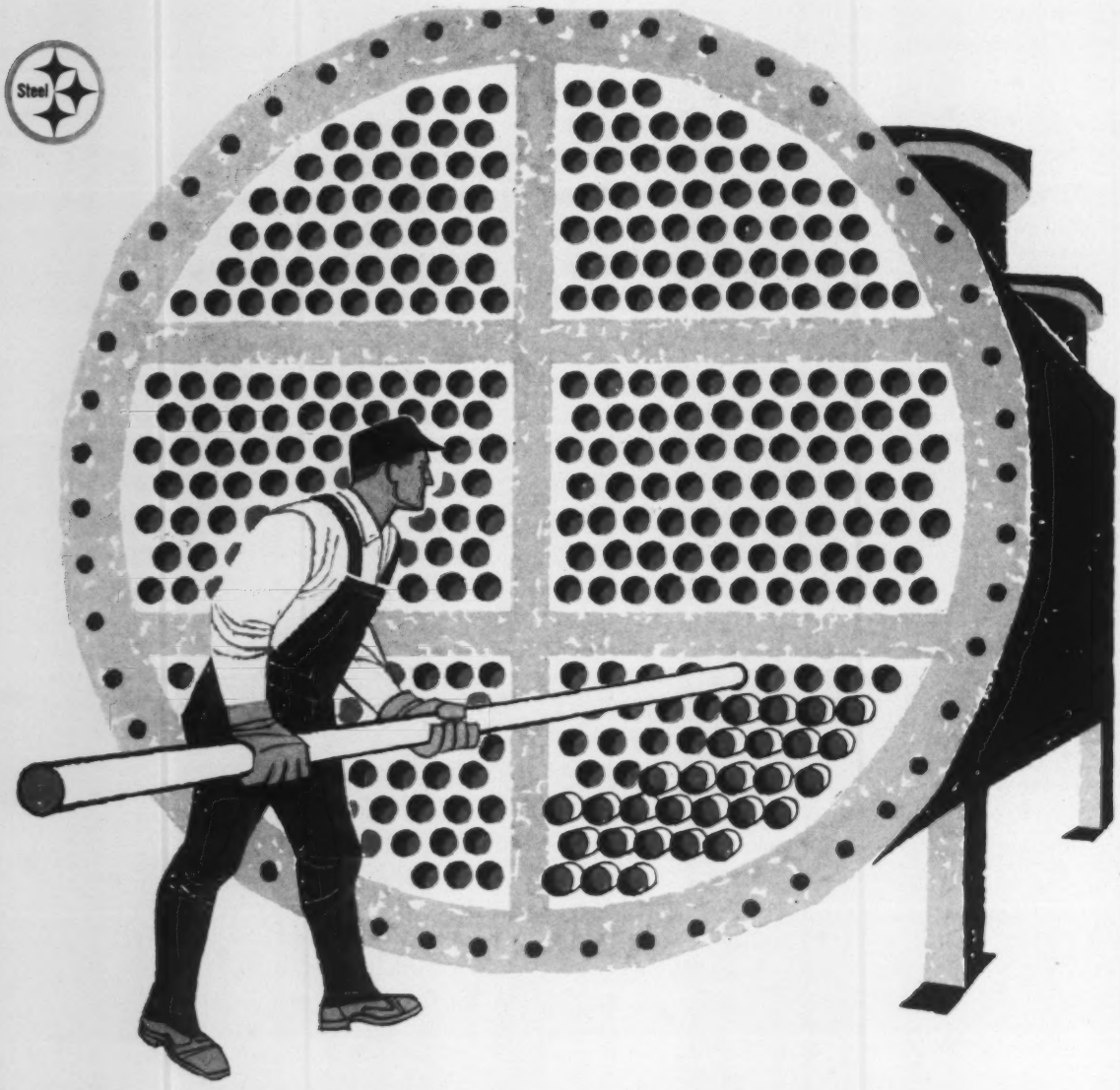
Foxboro Consotrol Recording-Control Station met every U. S. Steel specification. Consotrols provide precise, dependable control — plus full-scale 4-inch records — in only one quarter the panel space required by conventional 12" instruments.

But panel savings are only part of the Consotrol story. Maintenance is easier, too. Not to mention accurate, dependable, trouble-free performance. Bulletin 13-18 has the complete story — write for it. The Foxboro Company, 803 Neponset Avenue, Foxboro, Massachusetts. **Reg. U. S. Pat. Off.*

FOXBORO

REG. U. S. PAT. OFF.

HITACHI
a name to remember
in special iron & steel products
The demands of modern living are nowhere more dramatically reflected than in the increasing demand for iron and steel products, and we are proud to be helping to meet that need. Our products include malleable pipe fittings and iron castings; ductile cast iron for use in crankshafts, camshafts, sprocket wheels, etc.; cast iron and steel parts for rolling stock, automobiles and rolling mills; forged steel parts for industrial machinery (rotor shafts, thrust shafts, counter shafts, axles, gears, rollers, etc.); machine tool steels, high speed steels, stainless and other special steels. We are the largest manufacturers in Japan and have exported the above products all over the world.
Hitachi, Ltd.
Tokyo Japan
Cable Address: "HITACHY" TOKYO



How to prevent corrosion when the pressure's on

Armco Steel Corp. /
The Babcock & Wilcox Co., Tubular Products Div. /ı
The Carpenter Steel Co., Alloy Tube Div. ı
Clayton Mark & Co. /
Jones & Laughlin Steel Corp., Electricweld Tube Div. /
National Tube Div., United States Steel Corp. /
Ohio Seamless Tube Div., Copperweld Steel Co. /
Republic Steel Corp., Steel and Tubes Div. /ı
Revere Copper & Brass Inc., Rome Mfg. Co. Div. /ı
Sawhill Tubular Products, Inc. /ı
Southeastern Metals Co. /
The Standard Tube Co. /ı
Superior Tube Co. ı
Trent Tube Co., Subs. Crucible Steel Co. of America ı
Union Steel Corp. ı
Van Huffel Tube Corp. /
Wall Tube & Metal Products Co. ı

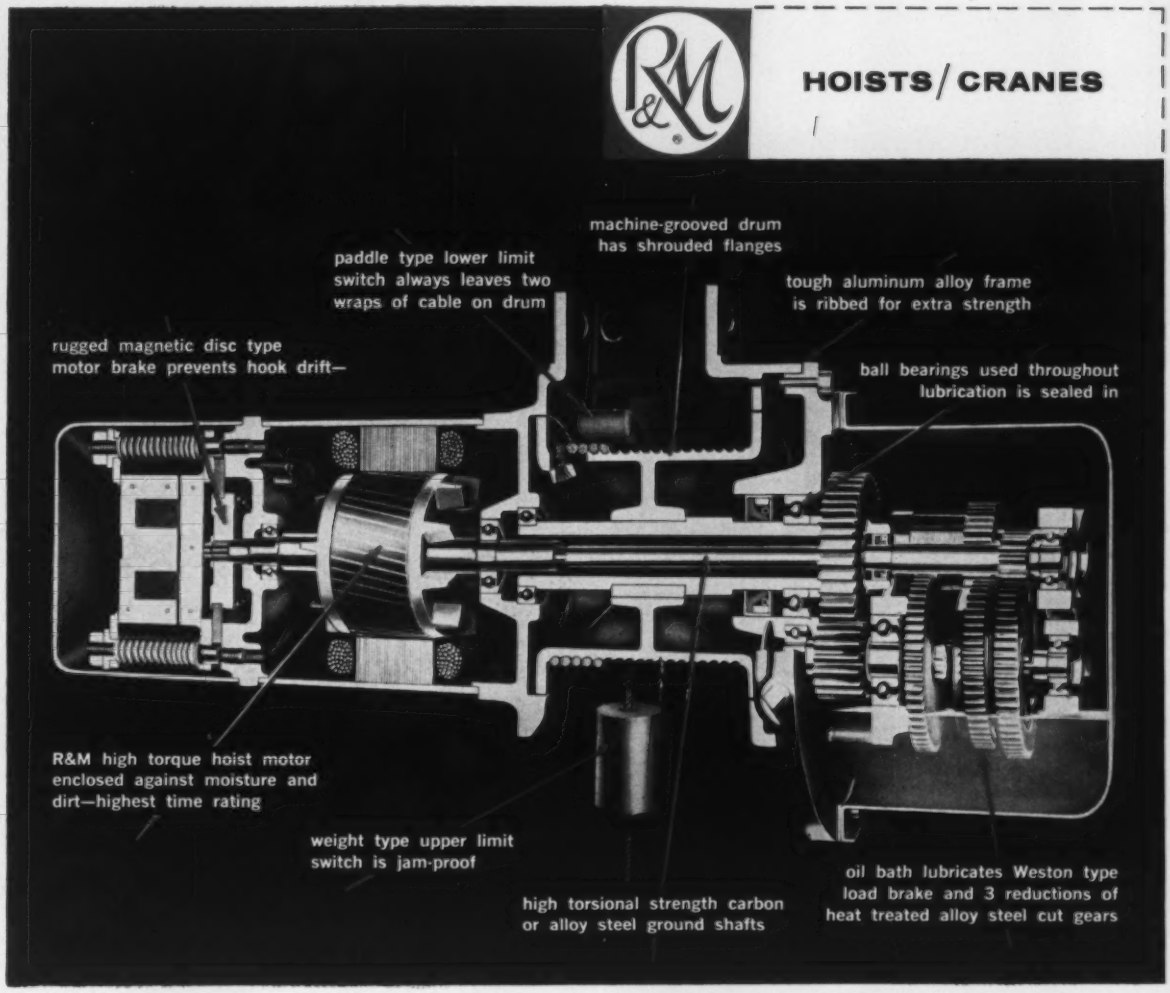
ı PRODUCES WELDED STAINLESS STEEL TUBE
/ PRODUCES WELDED CARBON STEEL TUBE

Hundreds of miles of welded steel tubing in various stainless analyses are being used in heat transfer equipment in the process industries . . . proving its dependability.

Welded stainless steel pipe also has proved its economy and dependability. It is readily available in Schedules 40S, 10S and 5S from manufacturer's stocks and local Steel Service Centers.

You can get the assurance of stainless tubing and pipe that meets high domestic standards from the quality stainless producers listed at the left. It will pay you in precision as well as in cost cutting, corrosion-killing reassurance to get information about stainless steel welded tubing from any of them. Or you can write to Department IA-2, Welded Steel Tube Institute, Inc., Hanna Building, Cleveland 15, Ohio.

WELDED STEEL TUBE INSTITUTE, INC.


R&M
HOISTS / CRANES
machine-grooved drum has shrouded flanges
paddle type lower limit switch always leaves two wraps of cable on drum
tough aluminum alloy frame is ribbed for extra strength
rugged magnetic disc type motor brake prevents hook drift—
ball bearings used throughout lubrication is sealed in
R&M high torque hoist motor enclosed against moisture and dirt—highest time rating
weight type upper limit switch is jam-proof
high torsional strength carbon or alloy steel ground shafts
oil bath lubricates Weston type load brake and 3 reductions of heat treated alloy steel cut gears

HOIST VALUE WHERE YOU NEED IT

Robbins & Myers Type J hoists can go to work for you this week. Since they are stocked near you, it's no trick at all to see—and benefit from R&M's superb design advantages. They give value beyond competitive price: *because* no other hoist has a higher rated, better protected motor (30 minute, 55° C. rise), *because* you get two brakes—a disc type motor brake and a Weston type load brake, *because* you get upper and lower non-jamming limit switches. Ball bearings are used throughout and the three reductions of heat treated alloy steel gears are lubricated in a sealed bath. Capacities—¼, ½, 1 and 2 tons; mounting—lug is standard, push, hand geared and motorized trolleys are available. Voltage is reduced at the push-buttons; control is magnetic. Request Bulletin 905 from the Hoist & Crane Division of Robbins & Myers, Inc., Springfield, Ohio or Brantford, Ontario.

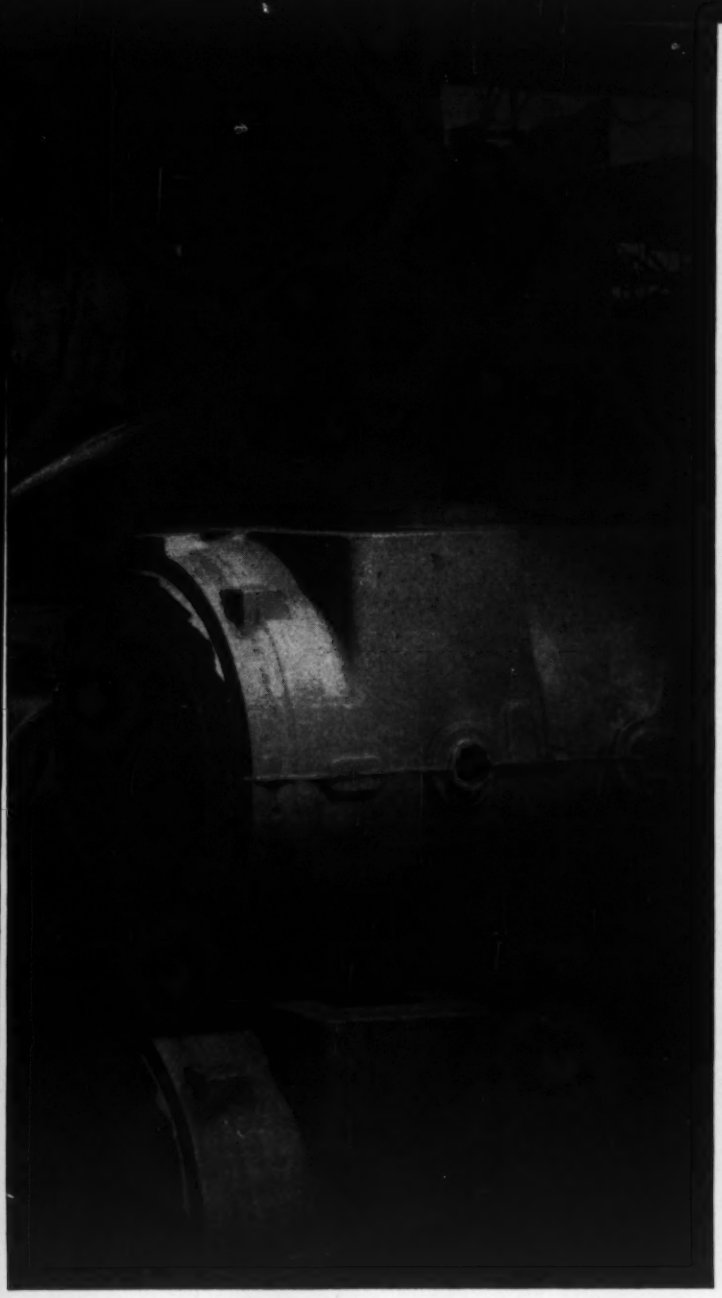
Type J hoists: seven bonus-packed models.

ROBBINS & MYERS

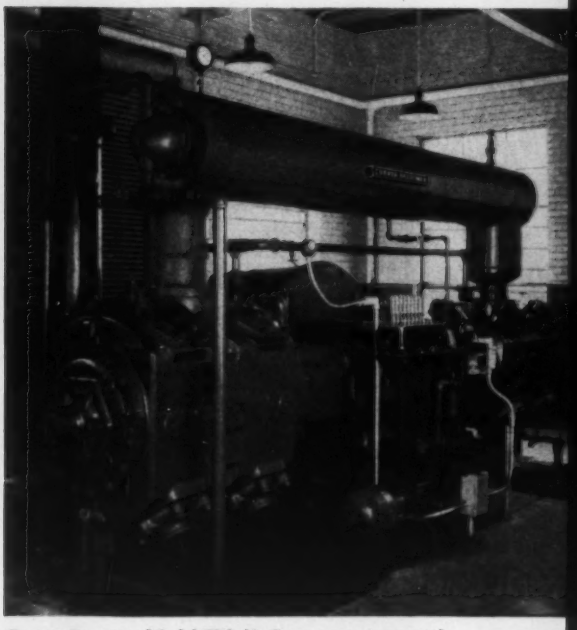
hoists & cranes, Moyno® pumps, motors, Propellair® fans

George Edick, *Domestic Sales Manager, The Cooper-Bessemer Corporation, and* Floyd Paschke, *Sales Manager, The Rotor Tool Company, explain...*

HOW TO BOOST YOUR PRODUCTIVITY WITH COMPRESSED AIR



Installing a Cooper-Bessemer DMR-3 Air Compressor for foundry service. Capacity is 1670 cfm at 110 psig discharge. Other units available for service down to 572 cfm.



Cooper-Bessemer Model EM Air Compressor in a metal-working plant. Rated 1125 cfm at 110 psig discharge. Other models in ratings up to 10,000 hp.

The thing that counts in getting top output with air tools is *air pressure at the tool, under load.* Is this productivity what it should be in *your* plant? Here is a service that helps you find out *for sure*...

The teaming up of application service engineering of Cooper-Bessemer and its new subsidiary, Rotor Tool, provides full-scope experience to help you analyze your compressed air needs and plan your facilities for optimum production efficiency. This experience encompasses the study of compressor capacity requirements, number of compressors and their location for greatest economy, regulation of the plant, the distribution system and portable air tools. This service is yours without obligation.

It will pay you to call in the nearby application engineer of Cooper-Bessemer or Rotor Tool to help you make sure that you are getting maximum productivity with compressed air.

BRANCH OFFICES: Grove City • New York • Washington • Gloucester Pittsburgh • Chicago • Minneapolis • St. Louis • Kansas City • Tulsa New Orleans • Shreveport • Houston • Greggton • Dallas • Odessa • Pampa Casper • Seattle • San Francisco • Los Angeles

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C-B Southern, Inc.... Houston
Cooper-Bessemer International Corp.... New York • Caracas • Anaco
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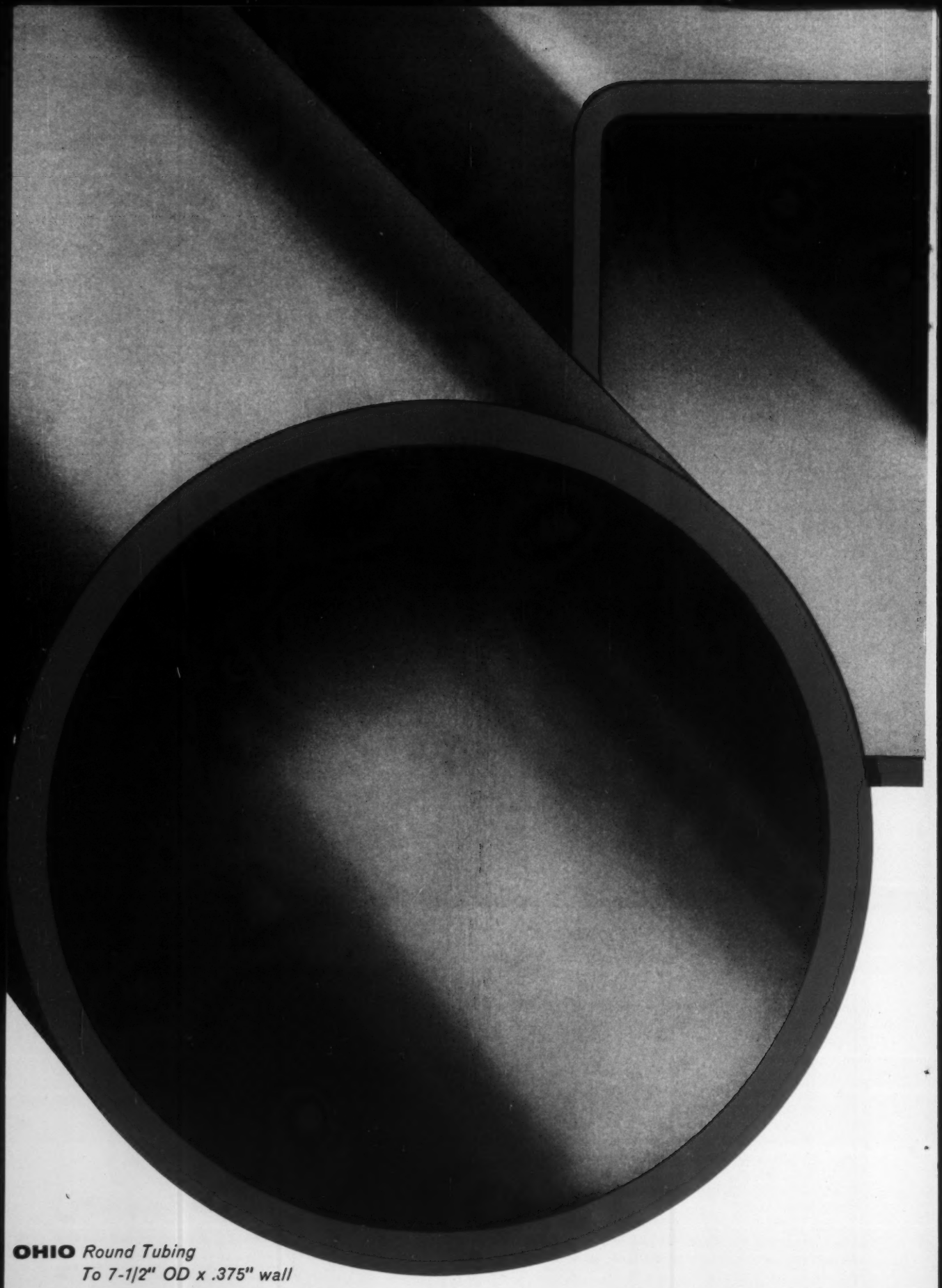
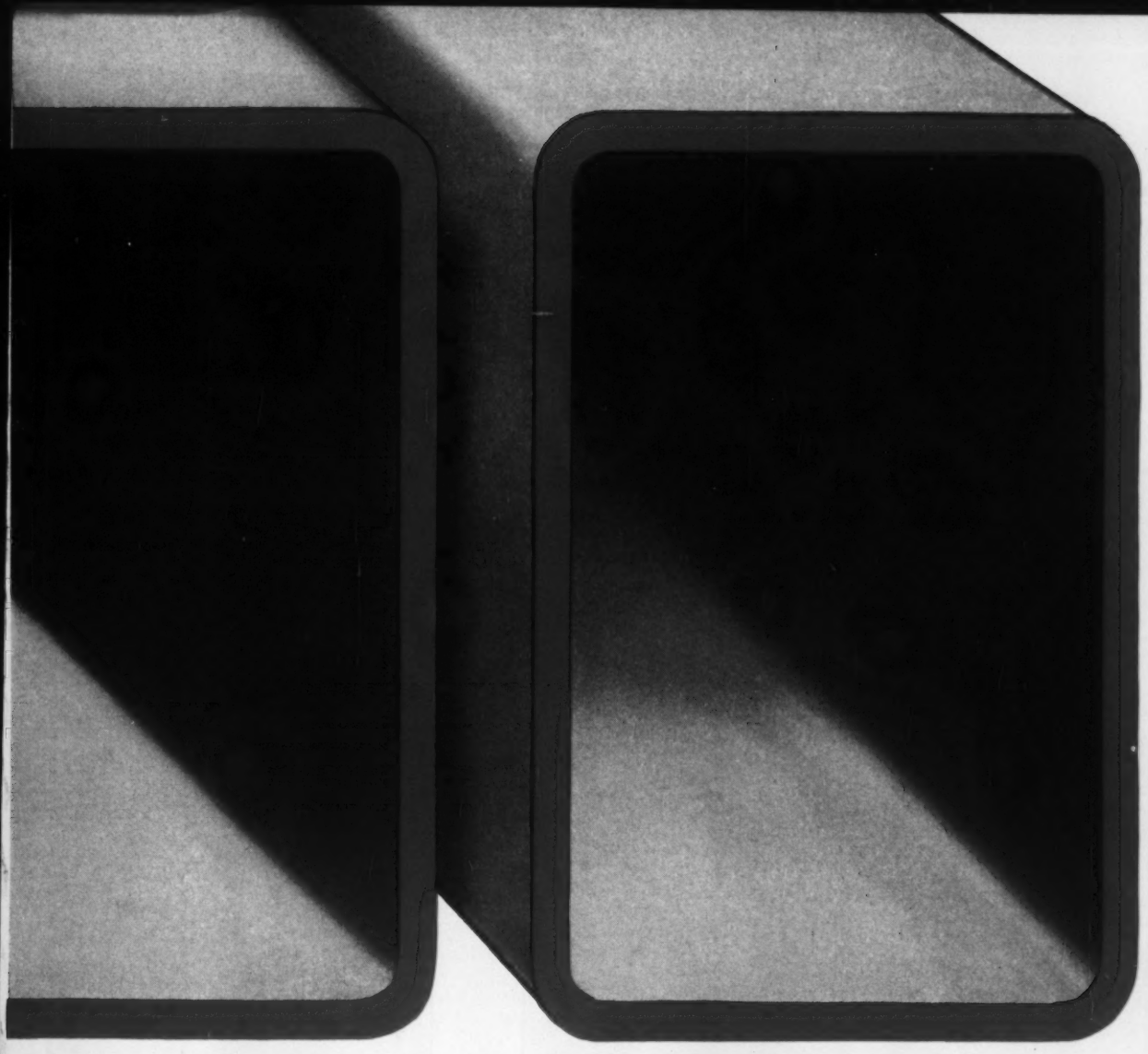
ENGINES: GAS - DIESEL - GAS-DIESEL
COMPRESSORS: RECIPROCATING AND CENTRIFUGAL, ENGINE, TURBINE OR MOTOR DRIVEN



OHIO *Round Tubing*
To 7-1/2" OD x .375" wall

A-3573A



OHIO *Square Tubing*
To 6" x 6" x .259" wall

OHIO *Rectangular Tubing*
To 7-1/2" major diameter x .259" wall
Typical 4" x 6" x .259" wall section illustrated

Announcing Mechanical — Pressure — Cold Drawn

OHIO QUALITY WELDED STEEL TUBING

in larger sizes...heavier wall thicknesses

New sizes and heavier wall thicknesses of Ohio Quality Welded Steel Tubing (up to 7½" OD) now parallel the sizes of famous Ohio Seamless Steel Tubing. That means — now more than ever — there's a type and size of Ohio tube to fit your special requirements exactly. And since we make both types, we're in a position to recommend the best type for your own particular needs. Ohio Tubing — either welded or seamless — is just "made to order" for your product.

OHIO SEAMLESS TUBE

Division of Copperweld Steel Company • **SHELBY, OHIO**

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

Cut along line and send air mail to save time.

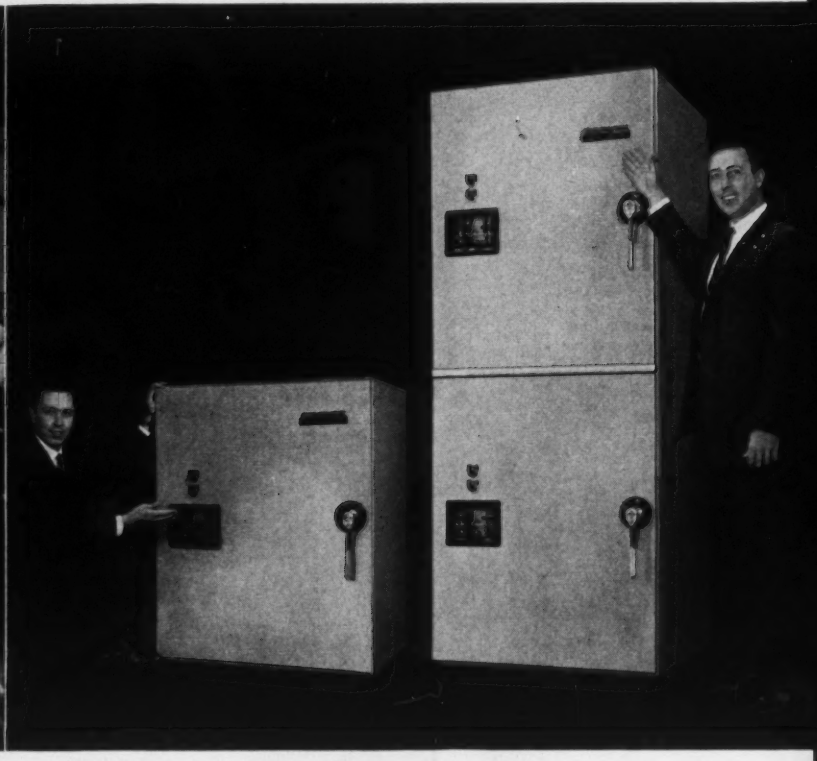
RUSH me, without obligation, latest information on new larger sizes and heavier wall thicknesses of Ohio Welded Steel Tubing.

Name_____ Title_____

Company _____

Address_____ City_____ State_____

ideas and news:



Fully adjustable stator blade control: Extends range of highly efficient axial compressors. Combines ability to meet fluctuating demands at constant speed with basic axial design advantages . . . steam savings of over 10%, and space and weight savings 25 to 50% of that required by comparable centrifugal compressors.

So low, two fit where one used to go: This new SpaceMaker control center is the first completely new 2- to 5-kv motor controller in more than a decade. Two-high design can cut floor space requirements in half. Complete drawout construction makes it the safest, most easily accessible controller on the market. New flame-retardent, track-resistant Super Pyro-Shield insulation adds to reliability, reduces size and weight. And, the all-new roll-out contactor is designed to cut maintenance time.

Which of these productive ideas could be working for you?

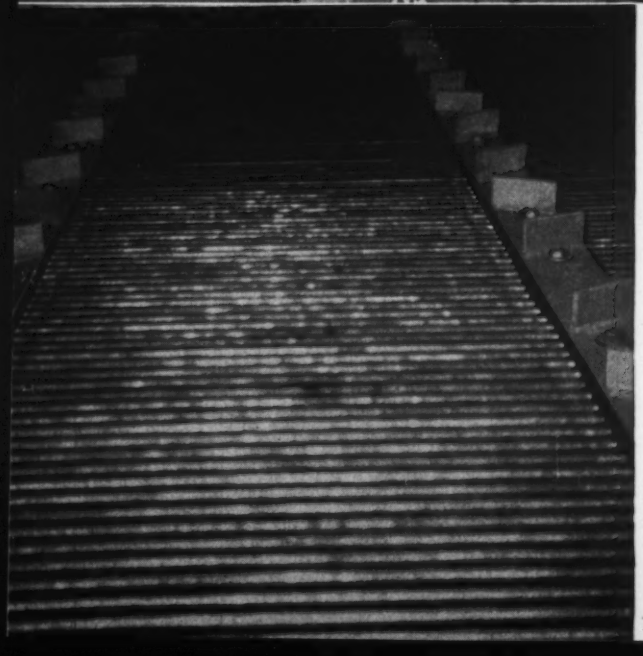
Screens that can't blind. Compressors with adjustable capacity at constant speed. These examples demonstrate the extra value that is standard with Allis-Chalmers . . . the greater efficiency and the added productivity which are yours when you buy A-C products, systems and services. Call your Allis-Chalmers representative for details on A-C "worth-more" features. Or write Allis-Chalmers, Industrial Equipment Division, 900 S. 70th Street, Milwaukee 1, Wisconsin.

A-1399

Systemation is an Allis-Chalmers servicemark. *SpaceMaker* and *Pyro-Shield* are Allis-Chalmers trademarks.

For quality control . . . lower processing costs: Systemation engineers at Allis-Chalmers will undertake responsibility for the design of complete operating facilities. Systemation service is based on a thorough understanding of your processing requirements gained from years as a major equipment supplier to your industry. Added is the experience of over 500 successful advanced electronic control systems by Consolidated Systems Corporation, an affiliate company.

Sixty-eight motors power plating rolls: When this electrolytic tin line went into operation in 1960, 68 Allis-Chalmers totally-enclosed fan-cooled dc gearmotors powered the plating rolls. Additional Allis-Chalmers motors and supporting motor-generator sets provide power throughout the line. Whether small process line drives such as these, or huge main mill drives, A-C motors have earned a reputation for long life and trouble-free operation.

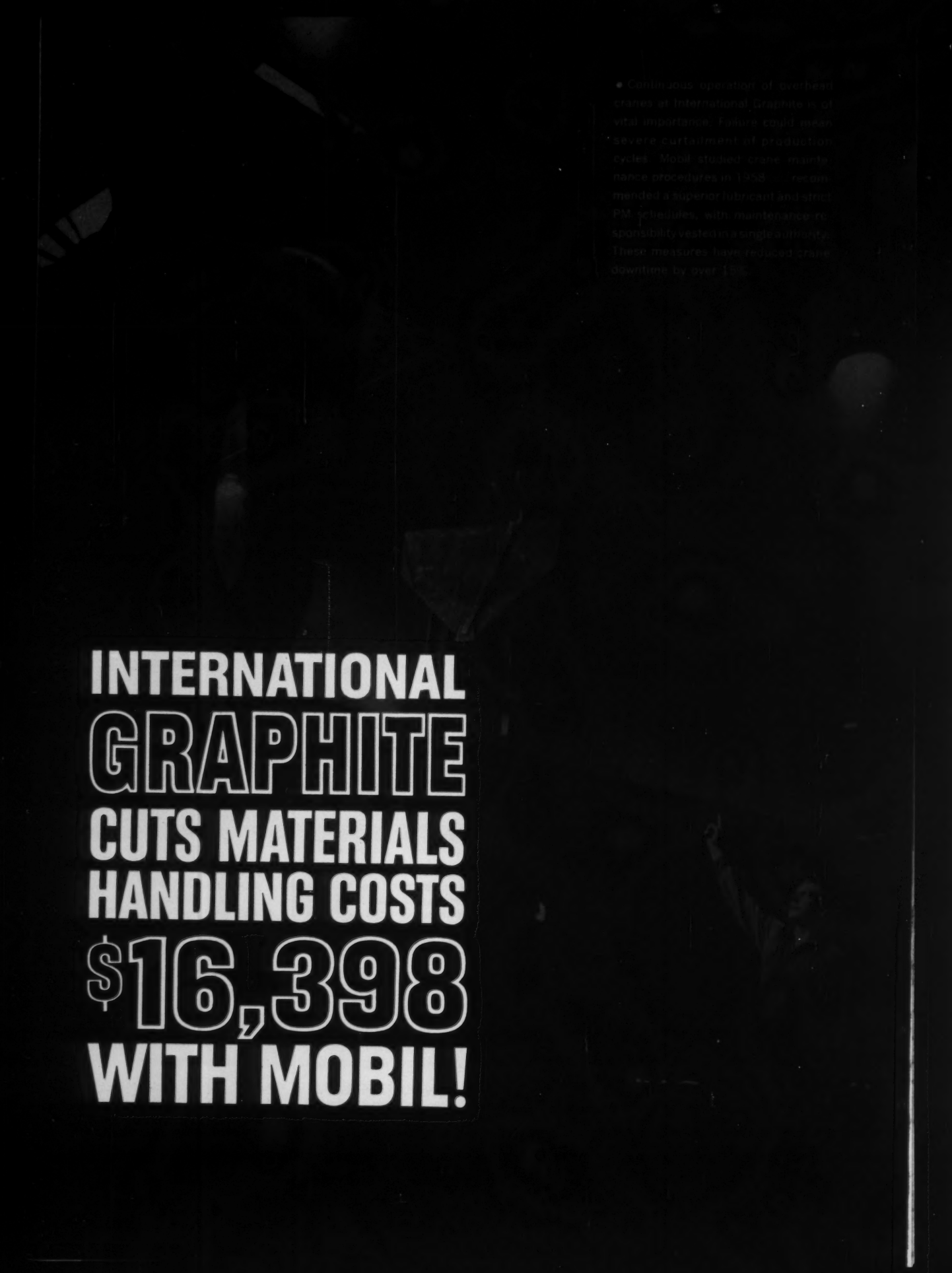


Screen moist, sticky ores without blinding: Allis-Chalmers new loose-rod deck for vibrating screens makes finer separations — down to ⅜ or ¼ in. — at increased capacity and improved efficiency. The rods roll and bounce, freeing themselves of sticky material. Similar cost-saving advantages are also found in A-C hot sinter screens and sizing screens.

A-C INDUSTRIAL EQUIPMENT DIVISION: motors, generators, controls, rectifiers, pumps, compressors, grinding mills, screens, industrial systems.

OTHER A-C PRODUCTS: thermal, hydro and atomic electrical generating equipment; switchgear, transformers, unit substations; tractors, earth-moving equipment, engines, lift trucks.

ALLIS-CHALMERS


INTERNATIONAL
GRAPHITE
CUTS MATERIALS
HANDLING COSTS
$16,398
WITH MOBIL!

• In addition to direct savings through use of premium oils and greases, there have been immediate and long-term cost reductions through greater engine efficiency and driver training. Gasoline savings have been particularly impressive. Despite increased plant activity, International Graphite has achieved a 30 month total savings in lower gasoline costs of over $5,692.

• For vehicular materials handling units, Mobil made these recommendations: installation of hour meters; proper use of premium lubricants; servicing on a 50-operating-hour basis (about 2 weeks) rather than on a rigid once-a-week schedule. Air cleaners better suited to the conditions of operation were installed. As a result, scheduled servicings have been reduced by an average of 633 annually. In the past 30 months cost of oil, grease and labor have been reduced $8,206.

• International Graphite's Maintenance Superintendent, Mr. Mel Price, center, reports that there have been substantial savings, too, in the area of motor overhaul. Prior to changes recommended by Mobil in 1958, complete motor overhauls averaged 9 a year on 25 vehicles. During the last 30 months, this has been reduced to an average of 7 a year. Resultant savings in reduced labor and parts costs have amounted to $2,500.

• For over 20 years, Mobil has helped reduce costs for the International Graphite and Electrode Division of Speer Carbon Company, Niagara Falls, New York, a major producer of such finished graphite products as anodes, electrodes, and molds, as well as specialties for the railroad, chemical and munitions industries.

International Graphite faces exceptionally severe maintenance problems because of highly unusual conditions at the plant. Abrasive particles of carbon, sharp sand and silicon-carbide find their way into all types of materials handling equipment, necessitating a heavy schedule of preventive maintenance. By recommending superior lubricants and improved PM techniques, Mobil Engineers have helped International Graphite effect an additional $16,398 reduction in costs of maintaining and operating this equipment during the past 30 months.

Consistently over the years, Mobil has *proved* its value to industry. To learn how Mobil may help you, call your nearest Mobil Representative. Or write, Mobil Oil Company, 150 East 42nd St., New York 17, N. Y.

Mobil

A roll's life holds no secrets

Men like National's metallurgist Joe Marsalka see to that. Before your roll is born, National helps select the proper composition, grade and hardness. As it is being produced, our metallurgists carefully control chill locations, pouring procedures and heat treatment. When the roll is "full-grown" ultra-sonic testing equipment checks its internal soundness making sure your roll is ready for the tough life ahead. Even after your roll is shipped, National keeps in touch with its performance in your stand. This intimate knowledge of roll life is one reason we are able to consistently produce quality steel, iron and nodular iron rolls. It's a big reason why... NATIONAL'S THE GROWING NAME IN ROLLS.

NATIONAL ROLL & FOUNDRY DIVISION
GENERAL STEEL CASTINGS CORPORATION, Avonmore, Pennsylvania
General Steel Castings Corporation, General Offices: Granite City, Ill. Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.
Subsidiary: St. Louis Car Company, St. Louis, Mo.

SAVING TIME ON THE LINE

Sems

PERMIT HOPPER-FED DRIVING OF LOCK WASHER AND SCREW!

There's an opportunity for real production-time savings in Sems. They're pre-assembled to eliminate handling of separate lock washers and screws on the assembly line . . . can be applied with a hopper-fed screwdriver for extra man-hour economies. Broad selection of types and sizes available. Inquire today.

38 Sources throughout the nation for fast, efficient service

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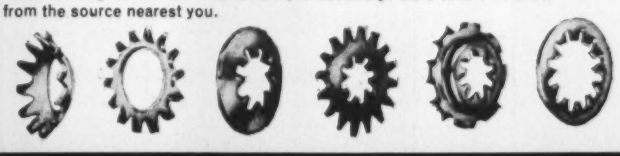
FOR GREATER PRODUCT DEPENDABILITY

Specify SHAKEPROOF® LOCK WASHERS on Sems

Each Shakeproof Lock Washer is especially designed to insure a firm grip in a specific type of application. They come in a wide variety of styles and sizes—all engineered for mechanical pre-assembly. Save time . . . order from the source nearest you.



Sems

pre-assembled screw and lock washer

SEMS is a development of Illinois Tool Works, Chicago

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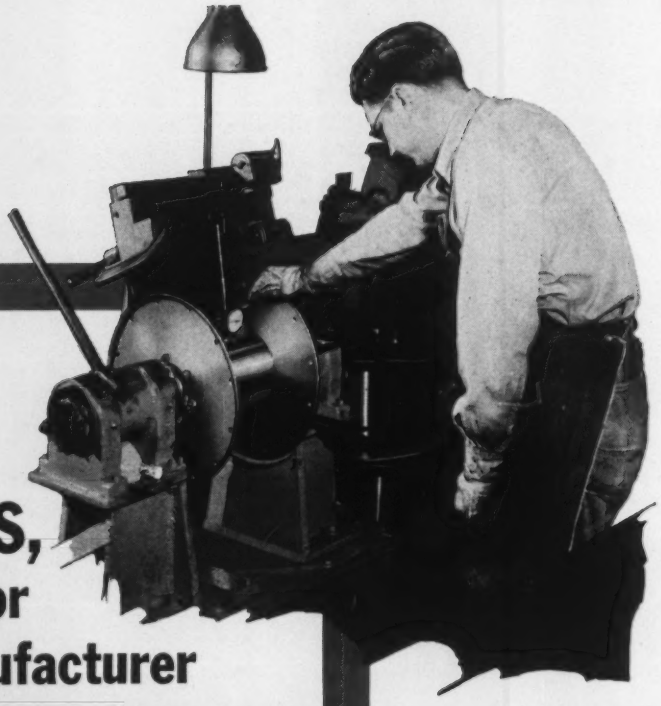


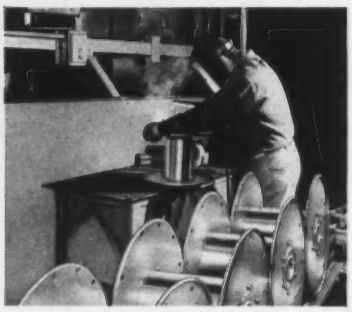
how PARISH CUT COSTS, saved time for another manufacturer

problem: A big user of wire cable needed wire reels requiring close parallel tolerances between heads in large quantities, at low cost—and fast!

solution: Parish engineers quickly blue-printed the problem and production specialists went to work. Soon Parish's skilled craftsmen, using the most modern precision machinery, were turning out 50,000 reels a month . . . meeting every specification perfectly, and on time.

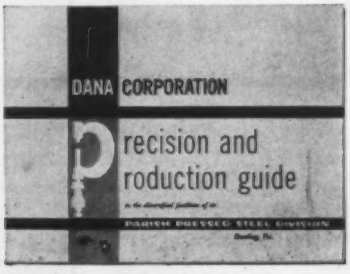
Parish specializes in solving production problems involving metal parts of all sizes, shapes, and forms. It is equipped to mass-produce precision parts at reasonable cost.

Perhaps Parish can help you • Write or telephone next time you have a parts production problem.

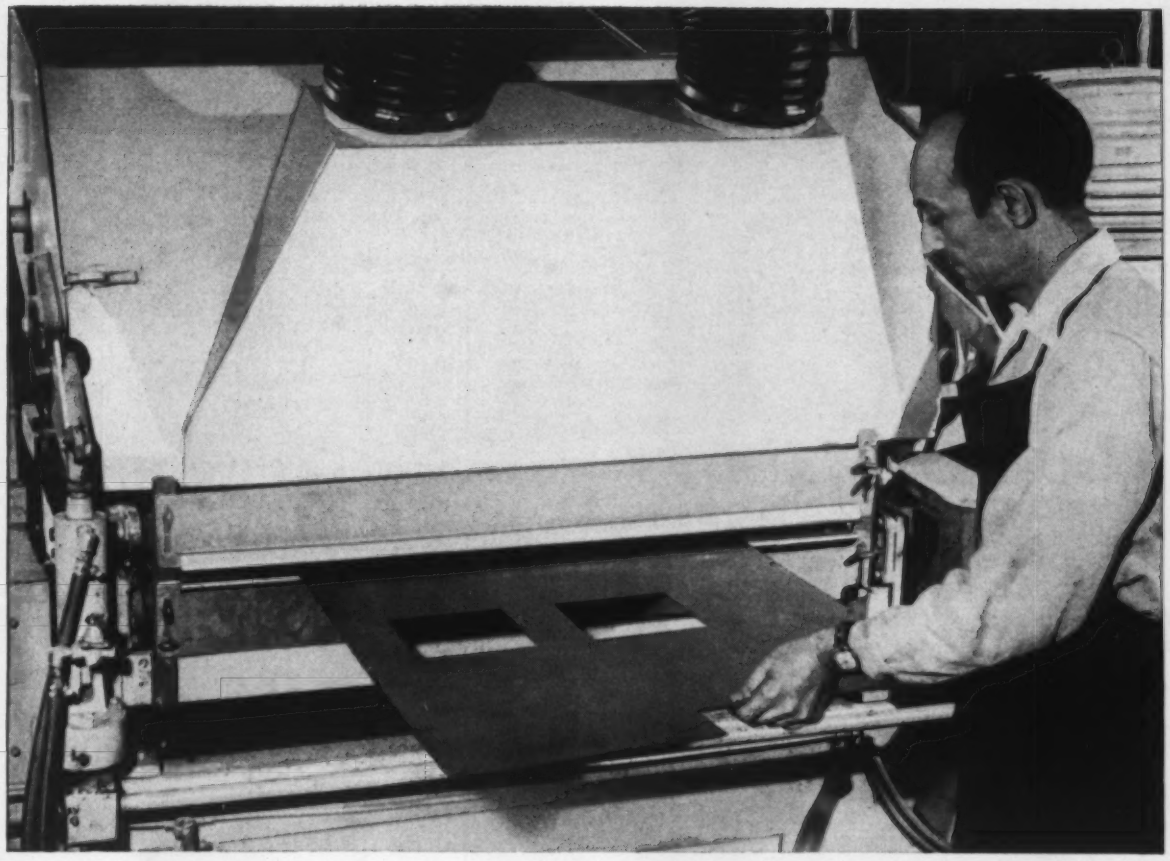


Bolts were welded to heads of wire reels to prevent back-out when reel is in high-speed operation. Main illustration shows how each reel was carefully tested before being shipped.

Write for your copy of this illustrated booklet describing the diversified facilities available to you at Parish.



PARISH
PRESSED STEEL
DIVISION OF DANA CORPORATION • READING, PENNSYLVANIA



3M Abrasives Help AMF Reduce Sheet Metal Deburring Costs

Innumerable ferrous and non-ferrous sheet metal components are manufactured for cigarette, cigar, bakery, and Automatic Pinspotter Machines at the American Machine & Foundry's Brooklyn, New York plant. Sheared to size and punched, components must then be deburred and cleaned prior to painting and plating. The previous method, using abrasive discs, often left swirl marks which had to be removed in a secondary hand sanding operation at extra cost.

As the result of a recommendation from a 3M Representative, AMF switched to the use of a wide-belt sander and "Three-M-ite" Resinbond Cloth Belts on these operations.

The results were remarkable. The new wide-belt prefinishing method eliminated all extra re-work, provided a better pre-paint surface, and cut unit costs substantially. Unit production time was slashed from more than 9 minutes to less than 30 seconds.

Why not let 3M's new COST CHECK 5-4-5 Program help you to effectively investigate ways to lower costs and increase profits. Discover . . .

- If your grinding can be done more economically
- If your finishing is as efficient as possible
- If your polishing can be done faster and better

Send today for a free COST CHECK 5-4-5 Review Form *without obligation*. Put 3M's years of abrasive know-how at your disposal.

3M Coated Abrasives

SEND IN TODAY

3M COMPANY, Dept. AAS-31
900 Bush Ave., St. Paul 6, Minn.

COST CHECK 5-4-5

Send me my Free COST CHECK 5-4-5 Kit

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MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

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Alabama Metallurgical Corp., Selma, Ala.: High-purity magnesium ingots ready for shipment; ALAMET also produces commercial and alloy grades.

L&N control facilitates magnesium reduction...

. . . at Alabama Metallurgical Corp., Selma, Ala., where thirty Electromax® controllers helped them swing into full production after only a few months of operation. Magnesium at this new plant is produced from briquettes of CaO, MgO, FeSi and CaF_2 which are reduced at 2150 F in evacuated retorts. Since startup in late 1959, Electromax has been consistently holding retort temperatures within ± 5 F. Additional instrumentation includes Speedomax® H which is recording flue and feed-zone temperatures of the lime burner kiln, and controlling temperatures of magnesium bath for casting into ingot and pig. You'll find L&N instruments providing equally dependable control for thousands of applications where heat is used . . . helping to produce both process economies and a quality product. When such significant savings stem from such a modest investment, *it pays to get the best.* For details about L&N controls for modernization or expansion, contact your nearest L&N office or write 4956 Stenton Ave., Phila. 44, Pa.

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With Electromax holding retort temperatures within ± 5 F, Speedomax G multiple-point recorders provide a permanent record of furnace temperatures.

MARCH, 1961

NATIONAL CARBON COMPANY'S

CARBON AND GRAPHITE NEWS

IN THE ARCHITECTURAL MARKET TODAY...

the push is on stainless!

BY RICHARD A. BIGGS

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IN THE ARCHITECTURAL MARKET TODAY...

the push is on stainless!

BY RICHARD A. BIGGS, MANAGER, CONSTRUCTION MARKET DEVELOPMENT
UNION CARBIDE METALS COMPANY • DIVISION OF UNION CARBIDE CORPORATION

The '60's offer bright new horizons for the use of stainless steel in the architectural market. Today, more and more people are asking about stainless and there are more specific answers to their questions. Architects are specifying stainless in more places on more important buildings. Last, and probably most important of all, stainless steel fabricators have developed new and improved techniques for ordering, handling, fabricating and erecting this rugged and attractive low-maintenance material.

Here are just a few of the advantages realized when stainless is incorporated in the design:

- ***STAINLESS*** **looks cleaner longer — stands weathering better.**
- ***STAINLESS*** **is an exceptionally strong material.**
- ***STAINLESS*** **handles the rough traffic without showing it.**
- ***STAINLESS*** **is fireproof.**
- ***STAINLESS*** **blends harmoniously with practically all other building materials.**

Introduction

Ten, fifteen, or even twenty years are frequently required to gain acceptance for what seems obvious as improved utilization of materials in construction. Novel construction materials or assemblies seldom, if ever, come into common acceptance quickly. Over thirty years ago, straight chromium stainless steels were installed as factory roofing in the industrial areas of Buffalo and Pittsburgh. Thanks to the pioneering spirit of a few brave souls—both architects and fabricators—some stainless steel was used in various publicly observable installations around the country. Two notable examples are the Empire State and Chrysler Buildings in New York City.

Meanwhile, stainless steel had gained wide acceptance in many industrial and commercial applications where rough and abrasive action must be resisted. The property of surface work-hardening stands stainless in good stead here. Also, thoughtful and observing people realize that stainless is extremely easy to maintain. Behind this realization lie years of use by the meat packing, dairy, brewing, canning and other food handling industries. Proven economical because it stands up to rough treatment and is easy to keep clean, stainless steel has invaded practically every area

where cleanliness is not only routine but vital. It is in the hospital – from instruments to incubators; and lately has come into the home in food handling equipment as well as numerous other utilitarian and decorative applications.

Accordingly, alert designers and others, wishing to capitalize on the ability of stainless steel to take rough treatment and still look clean, have incorporated this extremely durable material in more and more applications in the architectural field.

An Outstanding Example

Today, there are approximately 1,000 buildings in the nation utilizing stainless steel in their construction. Probably the most outstanding example of the utilization of stainless steel is evident in the new Union Carbide Building at 270 Park Avenue, New York City. This gleaming and attractive structure – consisting of a 52-story tower and a 12-story section fronting on Madison Avenue – employs stainless steel in hundreds of applications covering both the exterior and interior of the building. As a matter of fact, it is by far the finishing material used most, both in tonnage and in number of applications.

To win the vast number of jobs it holds, stainless had to be fabricative to the point of allowing designers wide latitude; hard enough to withstand heavy blows, scuffing and scraping in use; smooth enough to permit quick, efficient cleaning; chemically inert to the high degree required for proper health and sanitation; and pleasing to the eye.

Actually, the basic properties of stainless steel solve all of the above requisites except one. This is the requirement that stainless can be fabricated to offer wide latitude to the designer. It stands to reason then that fabrication knowledge is vitally important to increasing the use of this durable material of construction in the architectural market.

Fabrication Know-How is Vital

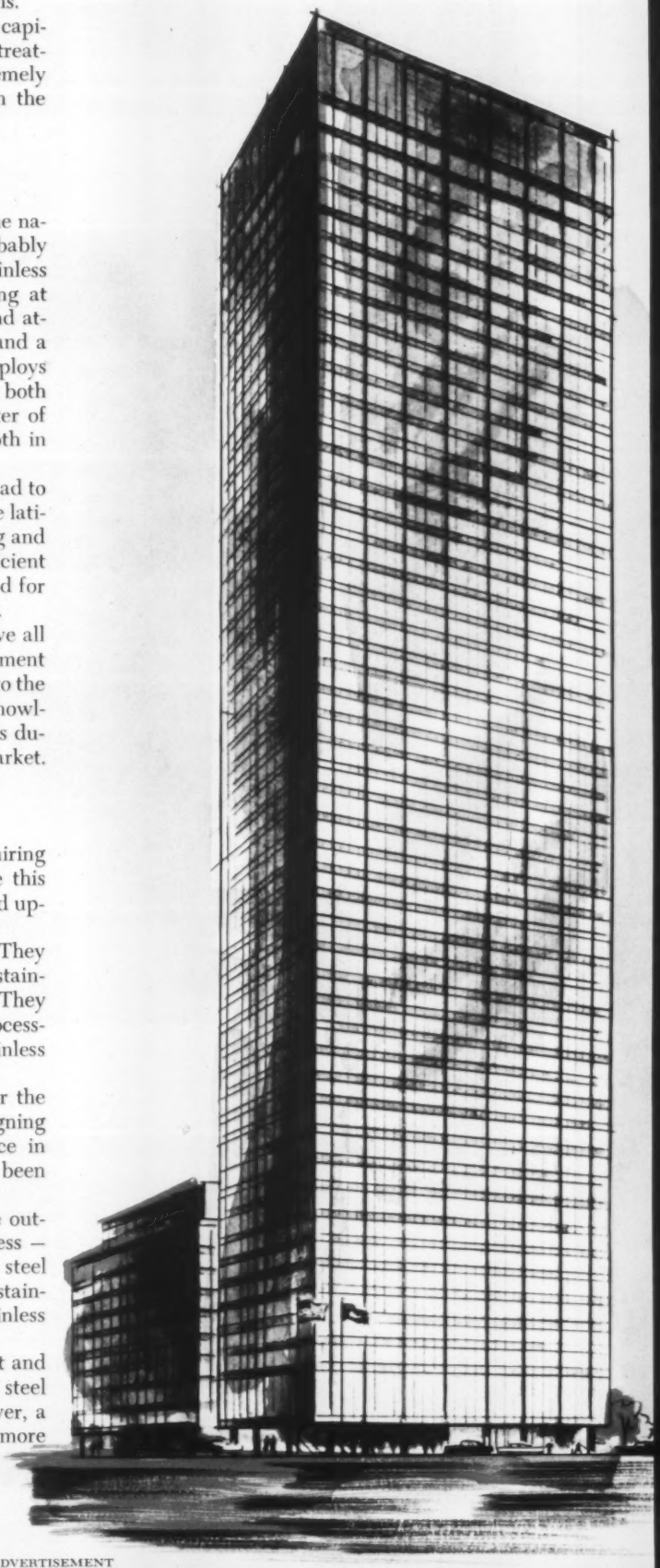
Smart, forward-looking fabricators have been acquiring all the know-how on stainless steel available, since this gives them a running start in this rapidly growing and upgraded metal-building construction market.

Fabricators are designing with stainless in mind. They are investigating ways to incorporate lighter gauge stainless in the product and still retain the strength factor. They are learning more about ordering, handling and processing of this material which will undoubtedly make stainless even more attractive to the architectural industry.

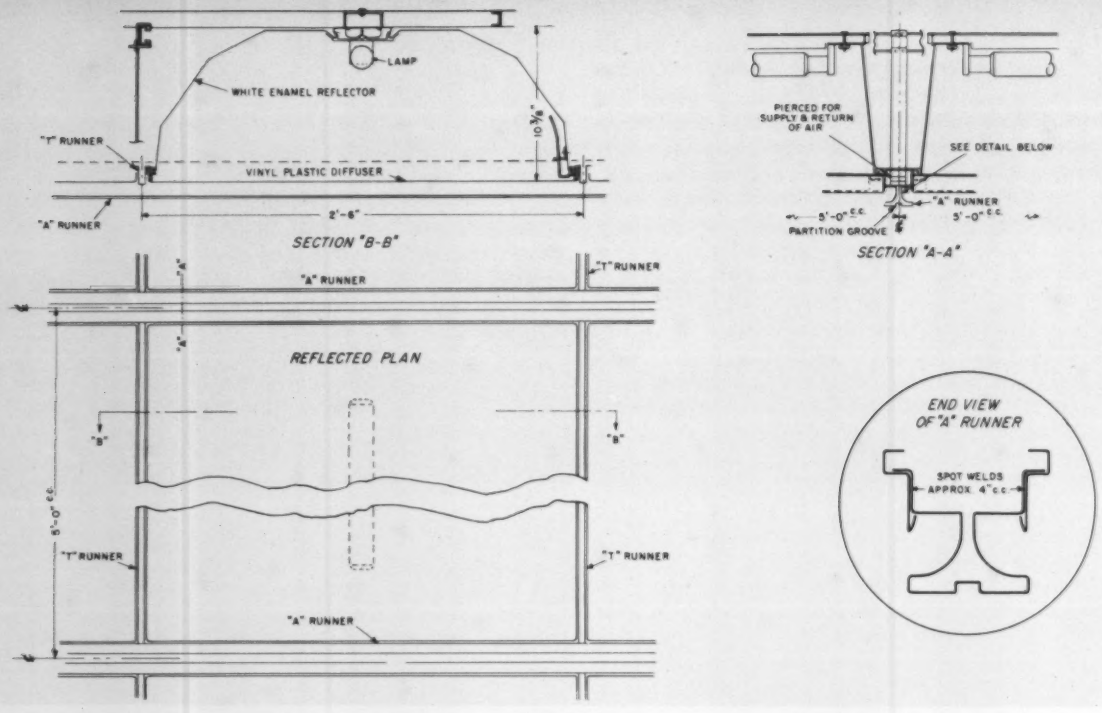
For example, a supplier of a stainless product for the Union Carbide Building recently stated, "By designing specifically for stainless, and by gaining experience in ordering and working with this material, we have been able to lower our costs 20% in the last five years."

These new fabrication techniques – added to the outstanding properties and low ultimate cost of stainless – mean more metal contractors are offering stainless steel to their clientele, more architects are designing with stainless in mind and more owners have requested that stainless be fully considered for their building projects.

Because of space limitations, it is impossible to list and cover even in minor detail the hundreds of stainless steel applications in the Union Carbide Building. However, a more detailed coverage of some of the newer and more unusual applications will prove newsworthy.



ADVERTISEMENT



Line drawing showing the plan and cross-section of a typical fixture.

A Triple-Feature Ceiling System

Though this unique installation has been widely publicized, the stainless steel application here is deserving of a brief section of this article.

This ceiling system performs its multiple functions better than any previous ceiling. For example, it serves as a top finish for the room . . . provides a source of light and a means of supplying conditioned air . . . and acts as a top support for the movable partitions used to divide the floor space.

The star performer in this ceiling system is the stainless steel ceiling runner. This element provides the framing grid for the lighting fixtures, distributes the conditioned air, and anchors the tops of the movable partitions.

Stainless steel was selected for the ceiling runners only after studies showed it had several design and cost advantages over other materials being considered. It was found that stainless could be successfully and economically roll-formed into the desired shapes with clearly defined corners and with increased strength in the material – features important to modern design.

Roll-forming proved to be the key to fast, economical fabrication of the runners. Though this method has been used for many years to supply trim to the automotive industry, it has just recently come to light as a means of fabricating stainless for the architectural industry. As a matter of fact, the fabricator of the runners was able to roll three 15 ft. sections per minute utilizing custom built forming mills equipped with special dies. Slots for air discharge and exhaust were punched after roll-forming, but before fabrication. The three sections of the main runner were clamped in a fixture, and then stitch-welded in a continuous spot welding machine.

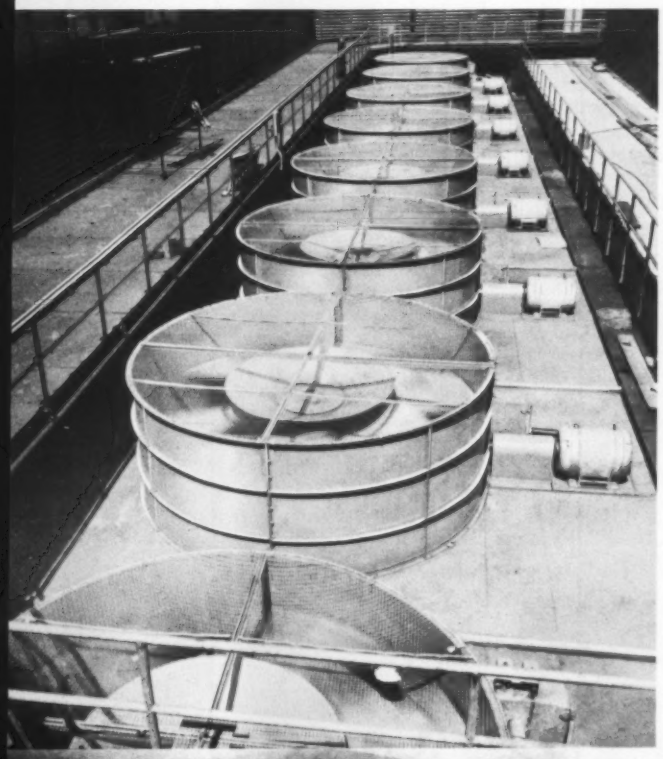
Approximately 500,000 linear ft. of runners in two different cross sections are used in the Union Carbide Building. This roll-forming technique was also used to produce the stainless steel mullions which accentuate the vertical lines on the exterior of the building. These mullions – said to be the longest continuous units of their kind ever produced – would form a stainless steel strip 19 miles long, if placed end to end.

A Low-Maintenance Cooling Tower

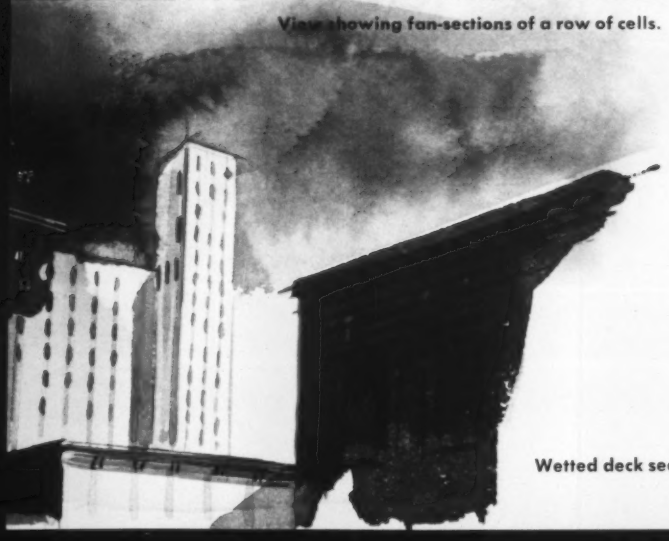
Many "firsts" have gone into the Union Carbide Building. One "first" of which Blazer Corporation, Passaic, New Jersey, is extremely proud is the all metal, stainless-fill cooling tower on the 52nd floor.

Through the years – wherever water recirculation was required – engineers have depended on wooden cooling towers. This is still true today. However, more and more forward-looking engineers are investigating the many advantages inherent in stainless towers. They require less space, weigh less, and offer fantastic savings in maintenance. In addition, Ben Blazer, President, Blazer Corporation, claims that today, because of advances in design, new fabrication techniques and experience in erection procedures, the initial cost spread between a metal tower and a wooden tower is very slight.

Ten years ago this was not the case. Even then, with a much greater initial cost spread, the low maintenance features of a metal tower assured substantial savings in ultimate costs over a short ten year period.



View showing fan-sections of a row of cells.



Wetted deck section being hoisted to roof.

To make this point, Mr. Blazer cited an interesting case history. Roughly ten years ago his firm was asked to bid on a cooling tower installation in New York City. His bid for a metal tower utilizing stainless steel was $22,000.00 versus $12,000.00 for a wooden tower. Based on initial price the wooden tower was installed. What has happened to this installation in the past ten years? First, the wooden tower has cost the owner approximately $10,000.00 in maintenance. This covers everything from replacing wood to removing splinters from the heat exchange equipment. In addition, the owner has now found that the wooden tower must be completely rebuilt at a cost of roughly $12,000.00.

To date, after only a short ten years of service, the wooden tower has cost the owner $34,000.00. The metal tower at $22,000.00 would still be operating efficiently and at most would have required only minimum maintenance.

"Honesty in the use of materials has always been a cardinal ingredient in our approach to designing and fabricating cooling towers. This is why we recommend stainless steel in so many places in our towers, even for setscrews and fasteners," says Mr. Blazer, President of the firm bearing his name.

The Union Carbide tower represents one of the largest ever pre-fabricated. Each of the nine cells measures 24 ft. long by 16 ft. wide and is split into two sections, the lower section consists of the wetted deck, sprays and sump. The upper section is the fan section. Each section has a 100 h.p. motor. 1,800,000 CFM of air is used to cool 15,000 GPM of condensed water from 105°F to 85°F. Stainless steel is employed in the fill or evaporator surfaces, fans and leaving eliminators, steel casings surrounding the fill, intermediate catch basins, and the sumps. The entire interior of the tower is accessible for quick maintenance and the fill is sectionalized for easy removal.

Hardware Spotlights Stainless

In architectural applications, few stand out as dramatically as hardware in the rapid rise of stainless steel items. A few years ago, one stainless steel producer ran an advertisement picturing an attractive new stainless door handle. A flood of inquiries resulted, but when the man handling the requests tried to find out who made the item, he was dismayed to learn that no one did. It was an advertising agency artist's dream of what one hardware manufacturer said he might sometime try to do. Today, most hardware and specialty metal producers offer in their catalogues items made exclusively of stainless steel or obtainable as an alternate to other more common materials.

Where thoughtful investigation has preceded design and fabrication techniques have been studied with stainless steel's characteristics in mind, very little, if any, premium is required of the client wishing to produce this better, more permanent product.

IntegraLock model featuring stainless steel knobs and escutcheons.

Sargent & Company, New Haven, Connecticut, was one of the first firms to adapt stainless steel in locks and builders' hardware. Initially, stainless steel was used for springs and functional parts of the lock because of its corrosion resistance and physical properties. In 1955, Sargent & Company introduced an IntegraLock model which featured stainless steel knobs and escutcheons in a choice of polished or satin finishes. This is basically the same lock which is used throughout the Union Carbide Building.

The reception by the architectural industry of this lock set was immediately enthusiastic. Why? Because the industry had been looking for a white finish on hardware that was both durable and attractive. Stainless steel does the job better than anything else.

Following the reception of the stainless steel IntegraLock, Sargent & Company immediately made plans for further use of stainless steel in their product lines.

"Today, stainless steel is a substantial and growing part of our architectural hardware business," says Mr. Charles A. Bauer, Vice-President, Product Engineering, Sargent & Company.

Stainless Invades the Furniture Industry

Through the years the furniture industry has been, and still is, predominantly a user of wood. However, specialty items have shown up in this industry over the years; some to stay and some to pass away unnoticed.

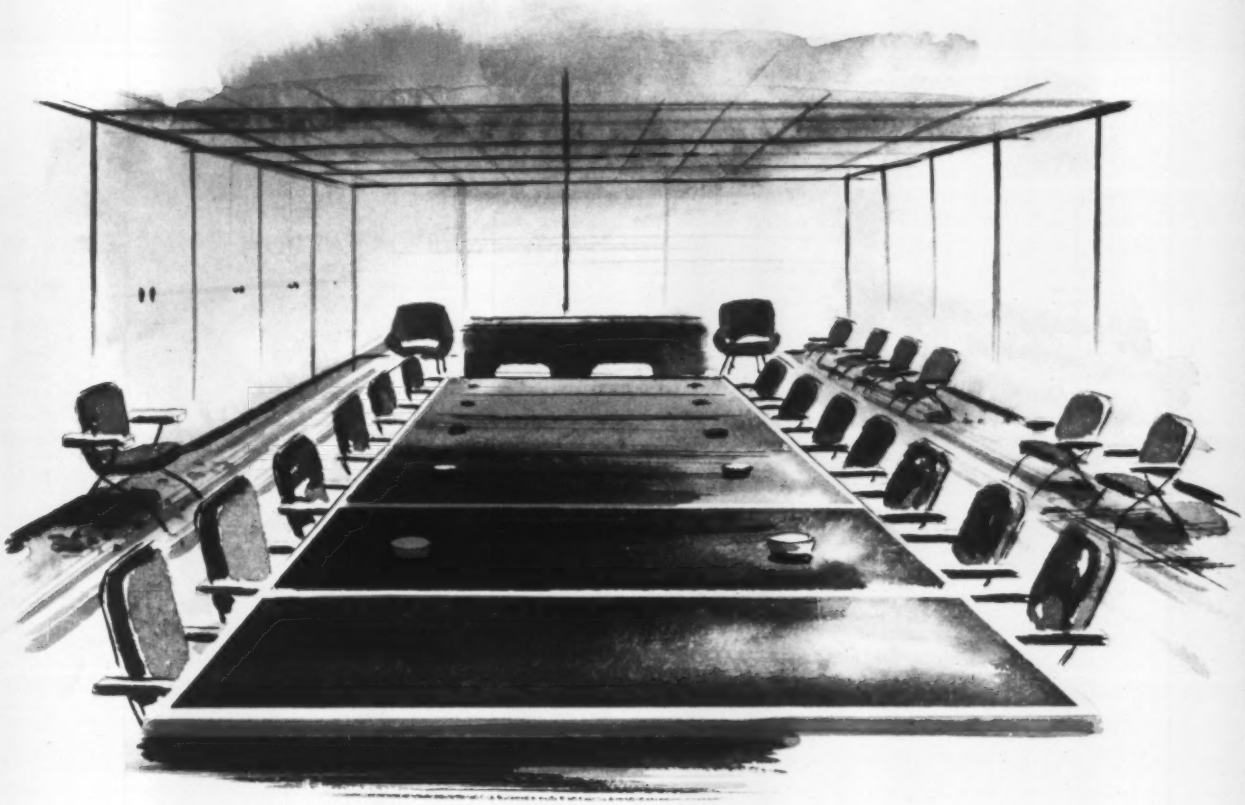
Metal furniture made its appearance in the industry in 1925. It was well received during this so-called "modernistic period" and through the years has been in and out of favor as design trends altered.

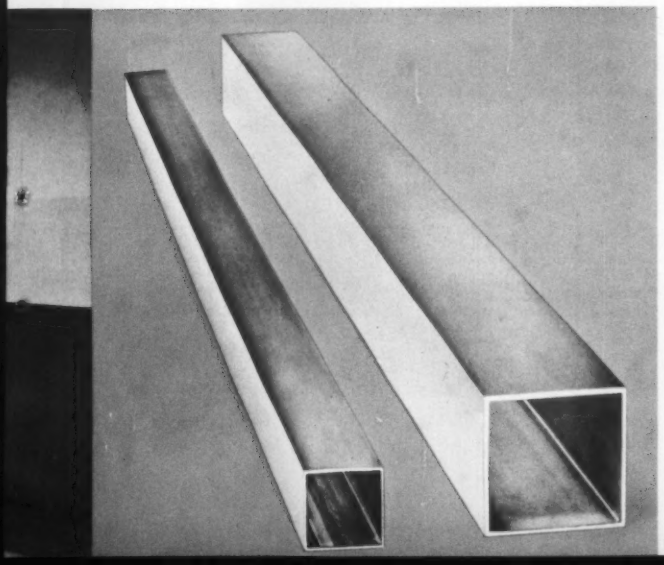
In recent years, more and more stainless steel has been used in the furniture going into today's modern architectural structures. The Union Carbide Building, for example, utilizes possibly more stainless steel furniture than any building in the country. Some of the offices are completely equipped with furniture featuring stainless steel frames and leg supports – desks, cabinets, couches, conference tables, some fabricated of 0.003125 in. radius square tubing and other units of bar stock. The legs and supports of tables and chairs used in the cafeteria are also made of stainless steel.

What are the underlying reasons for this recent shift to stainless steel in office and commercial furniture? One, more owners and architects are desirous of quality products that offer permanent, attractive finishes to comply with modern architectural styling. Two, metal furniture builders have developed better ways to weld stainless and have gained valuable experience in this operation. Not too long ago, welding stainless was a difficult job. It was easy to mar the metal and oxidation would occur at the joints. Today, thanks to the inert gas-shielded arc, plus other new techniques, the welding of stainless is no problem at all. Third, a stainless steel fabricator, Damascus Tube Company, Greenville, Pennsylvania, has managed to produce square and rectangular stainless tubing with exceptionally sharp corners. This has permitted architects to take advantage of stainless steel's strength, reduce its weight, and carry the modern styling of the exterior through the interior of the building.

Prior to this break-through by Damascus Tube Company, square stainless steel tubing could not be produced without a radius at the corner of at least the thickness of the material. The architects of the Union Carbide Building insisted on sharp, square corners on the furniture to conform with the clear, crisp styling of the building. They also recognized the appeal of stainless over plated tubes – better appearance, longer life, freedom from chipping, peeling, and other problems.

Since this is the first time this feat has ever been accomplished, naturally Damascus does not wish to reveal some of the tricks of fabrication. However, it can be stated that they start with a length of round tube and reduce this to a rectangle or square by special process that yields sharp, accurate corners and flat, parallel walls. In the process, tensile strength of the stainless is increased and its resistance to rust and corrosion is unimpaired while its aesthetic value is enhanced.





Almost as important as the actual fabrication technique itself, is the fact that here, in cooperation with a furniture manufacturer, Damascus has been able to achieve a major advance in stainless steel fabrication. This means that architects are afforded the same clear, sharp cornered appearance for both interior and exterior applications. In addition to furniture and office partitions, larger sizes of stainless steel squares and rectangles can be used for door frames, mullions, muntins and other architectural detail.

At present, Damascus structural squares and rectangles are available in 302 and 304 grades, and maximum size cannot exceed 1¾″ x 3″ in rectangles and 2¼″ x 2¼″ in squares. They can be furnished in a variety of finishes, from mirror bright to satin lustre.

Stainless steel structural squares produced by Damascus Tube Company.

Conclusion

The applications covered in this article are just a few of the many unusual uses of stainless steel in the Union Carbide Building. There are others. Seventy thousand linear ft. of flashing for one; rest room equipment such as fittings, mirror frames, paper dispensers and receptacles for another, where stainless steel's ease of maintenance stand it in good stead. The list is long.

It is felt that a good part of the credit for the surge of stainless steel in architectural applications belongs with today's progressive fabricators. Their knowledge has helped engineers and architects to design so effectively that when the bids are in, stainless steel prices are so close to alternate materials considered that the jobs are going to stainless. Add this to stainless steel's unique combination of properties plus its low maintenance features and it's easy to understand why the demand for this attractive and rugged material is growing in leaps and bounds.

Ease of maintenance should definitely be considered when figuring ultimate costs of stainless versus other materials of construction. For example, a recent survey — conducted by firms interested in building maintenance — shows that an owner can realize savings of roughly $50,000 a year in maintenance and cleaning costs if stainless steel is the predominant material used in the building. This means a saving to the owner of approximately half a million dollars over a ten year period.

As stated at the beginning of this article, the '60's offer a bright new horizon for stainless steel in the architectural industry. We are really just beginning to fully evaluate the possible ends achievable with this rugged product. As fabricators, engineers, and architects learn more about its potentials, more and more buildings will be designed effectively . . . fabricated easily . . . and erected quickly — with stainless steel.

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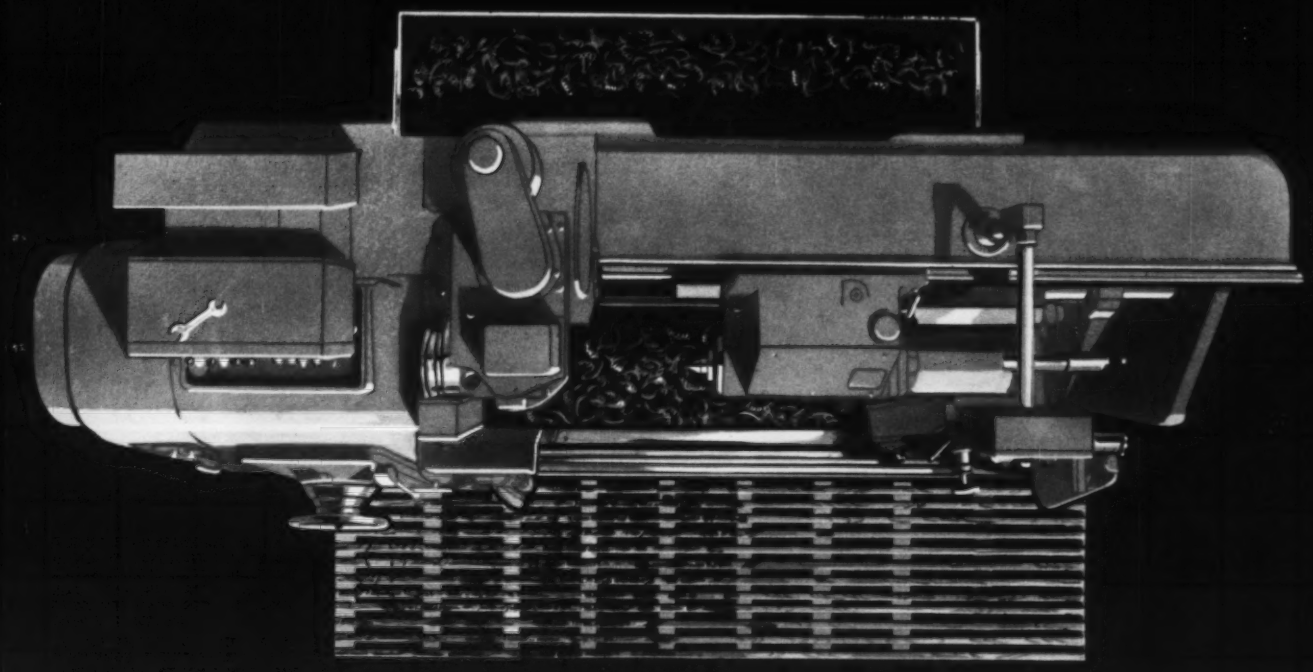


You can turn a profit on a New Britain +GF+ Copying Lathe

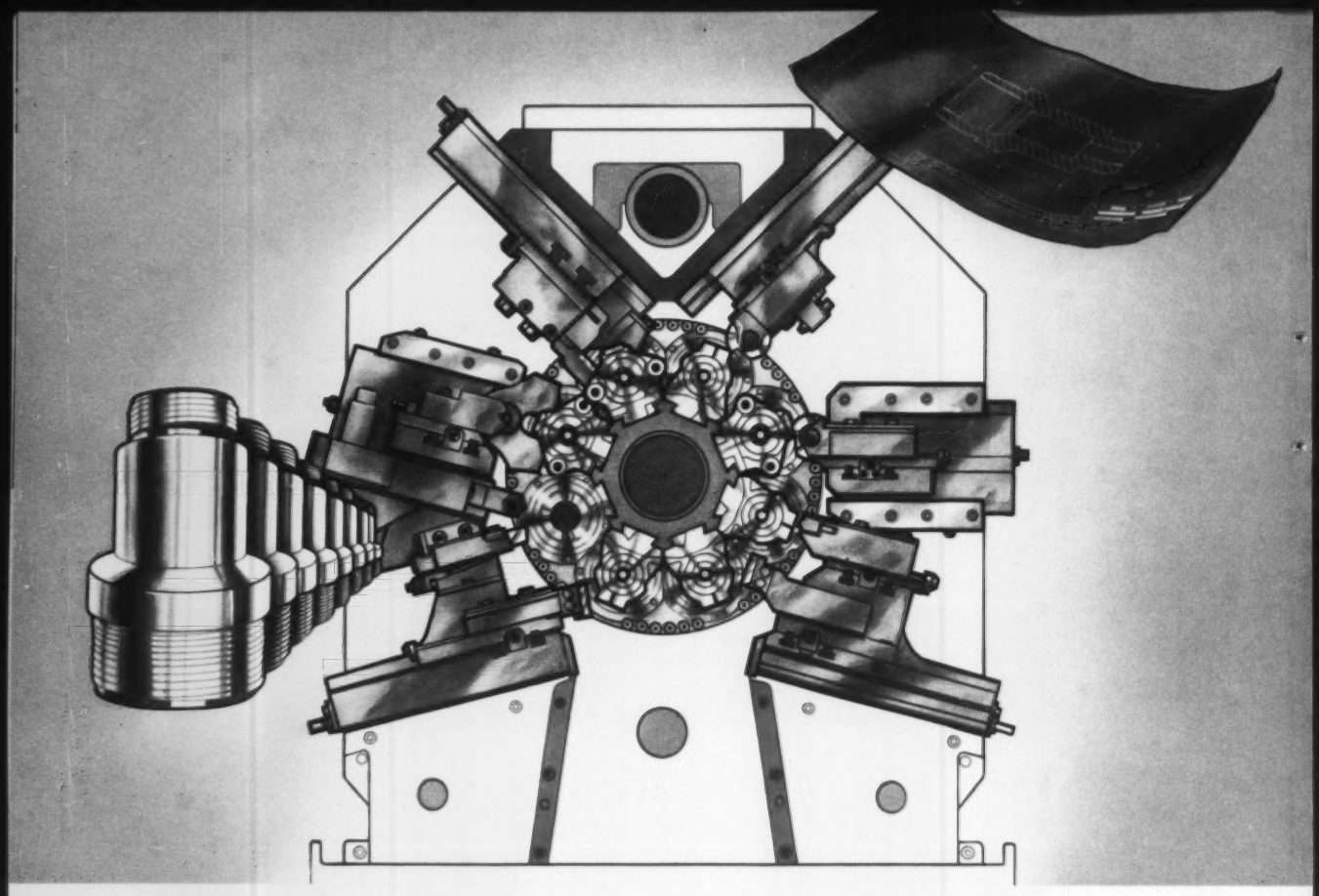
Here's a birdseye view of a New Britain **+GF+** Copying Lathe. It shows some important differences between this machine and conventional lathes with copying attachments. The point here is this—*the most effective use of the single-tool copy-turning principle can be made only with a machine designed from the ground up for this type of work.* The New Britain **+GF+** is just such a machine. Notice the chip pan. It's big (it has to be) and located for easy removal of chips from the back of the machine. The design of the work area allows for unobstructed free-fall of chips out of the way and into the pan.

The New Britain **+GF+** is massive and rugged, with plenty of power—up to 40 h.p., if you need it. It's simple to operate, quick to set up and change over. The single-point tool can be changed in one minute and it out-produces gang tooling setups in the bargain. Turning is controlled by either a template or a prototype. External and internal copying are accomplished in one set-up with special tooling.

The possibilities for short or long run chucked and between centers work on the **+GF+** are wide and varied. Because the work is produced with good surface finish and dimensional accuracy, grinding can be reduced and, in some instances, eliminated. Large diameters are broken down economically by successive parallel cuts, automatically if desired, with optional two-cut or multi-cut recycling.

You've got to see one of these machines in action to fully understand the kind and quantity of work they are capable of producing. Contact your New Britain Representative for demonstration arrangements or write The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division - New Britain, Connecticut



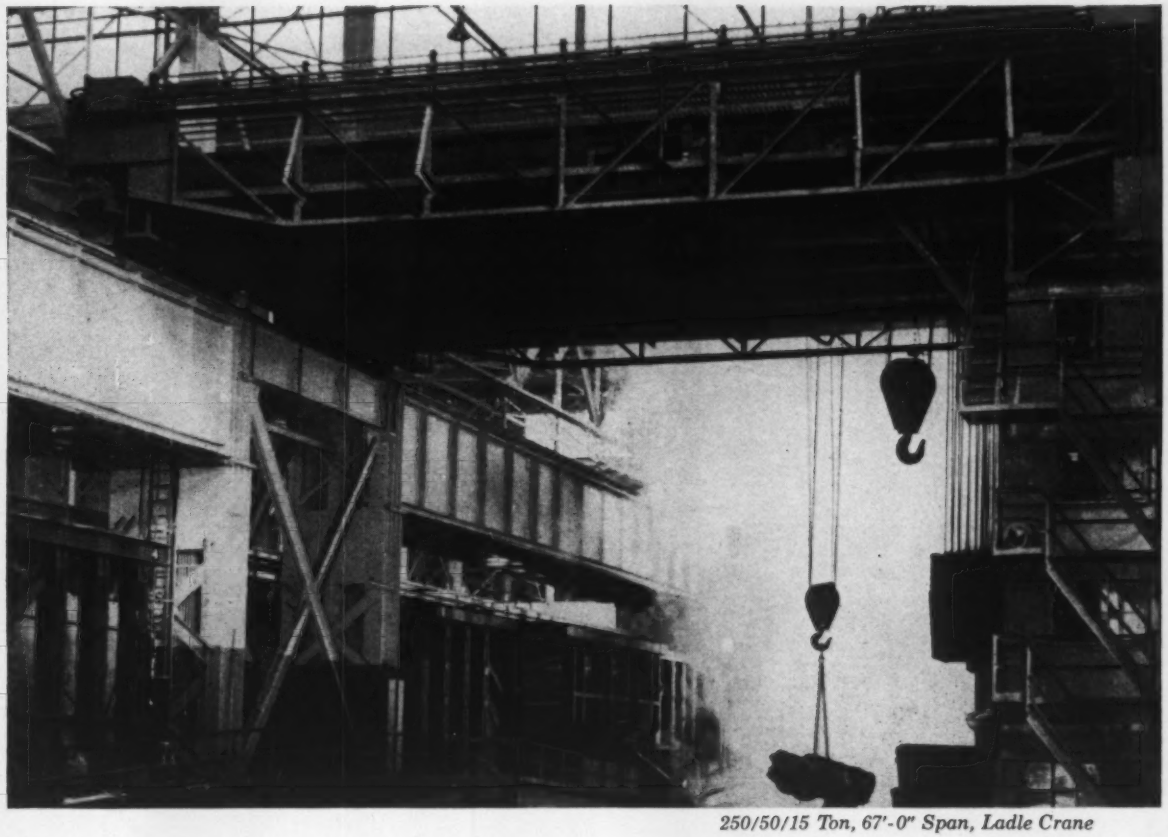
Unlimited tooling combinations with New Britain Bar Machines

Nothing can out-date your operation quicker than better machines in the hands of a competitor. In the race to keep ahead on quality, price and delivery, nothing can put you out front faster than machines capable of consistently producing the highest quantity of finished pieces at the lowest possible cost. New Britain's new series of bar machines represents in every way the most advanced bar-turning units available. Each of the four-, six- and eight-spindle models has been redesigned, adding new features and improving older ones. Unlimited cross slide and end-working tool combinations, extremely fast operation (even on stainless) and a variety of models and features to choose from add up to some good reasons for incorporating New Britains into your replacement or production expansion plans.

The eight-spindle model is the largest, most modern eight-spindle bar machine available. It has a stock capacity of up to 2⅝″ and provides six independently-operated cross slides. As with all New Britain bar machines, the operations of the cross slides and end-working tool slide are disc-cam controlled for positive actuation, close tolerance machining and easy, rapid change-overs.

This is only a very small part of a story that is bound to interest you. The whole story and its significance in terms of your profits is available from your New Britain Representative. If you prefer, contact us directly at The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division - New Britain, Connecticut



250/50/15 Ton, 67'-0" Span, Ladle Crane

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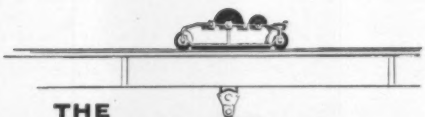
METAL IS KEPT MOVING WITH MORGAN CRANES

Highly efficient, dependable Morgan cranes help keep production moving smoothly at Kaiser Steel Corporation's Fontana, California, works.

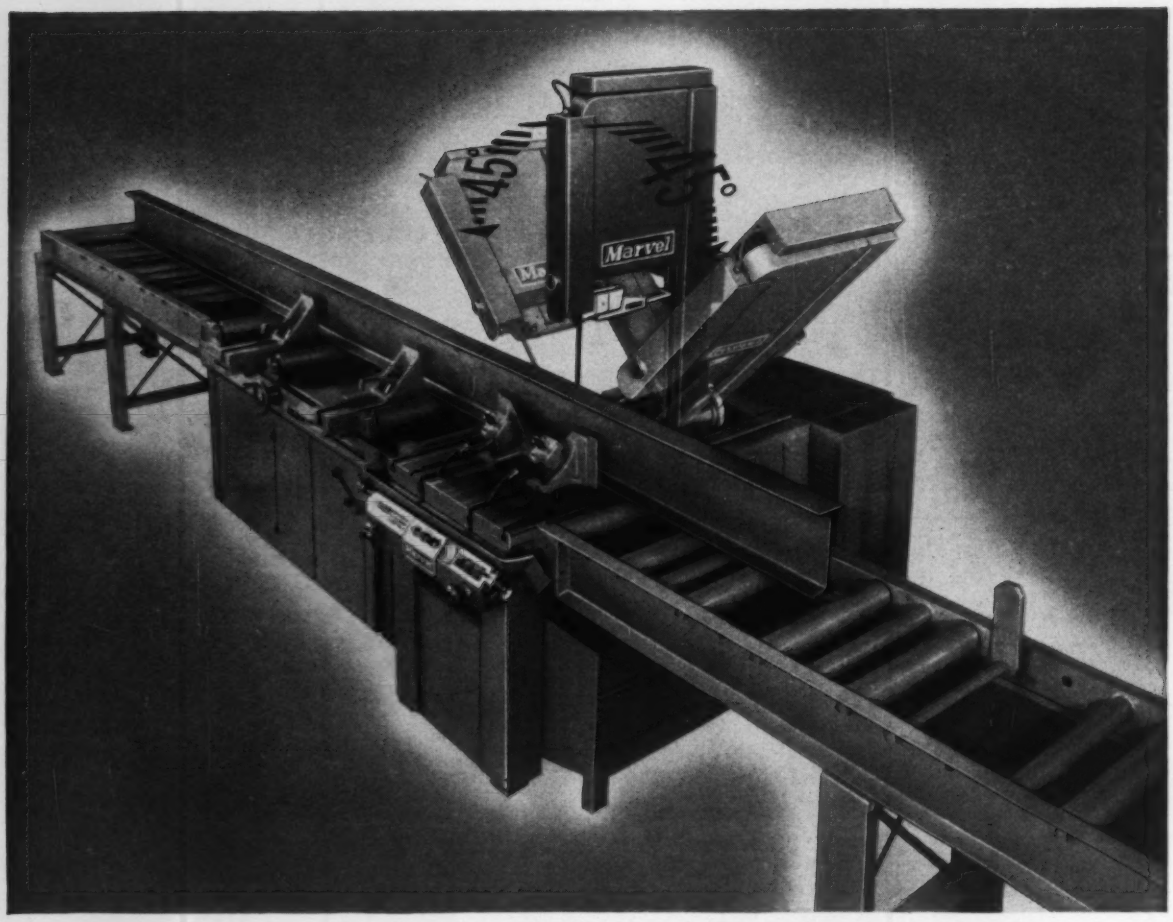
In making plans for mill modernization or expansion, put a Morgan Engineering representative on your planning team. He'll give you facts on Morgan cranes and other Morgan mill equipment that will assist in speeding production and lowering your costs.



THE MORGAN ENGINEERING CO. *Alliance, Ohio*

EOCI MEMBER

Overhead electric traveling cranes, gantry cranes, open hearth special cranes, blooming mills, structural mills, shears, saws, auxiliary equipment and welded fabrications.



Tips Its Head To Cut Production Corners

Sawing 45° miters in any kind of material has always been a simple task for MARVEL Saws, but moving the work up automatically and making consecutive cuts on an angle was a problem, especially when the work was long and cumbersome.

This triple exposure photograph of a new MARVEL No. 81A All Hydraulic Heavy Duty Automatic Bar Feed Band Saw, illustrates how the upright head or column can be tipped 45° either right or left of vertical to make angle or miter cuts. The work is held stationary while the column, which carries the blade, is fed forward, meeting the work squarely to insure accurate cutting. After the cut is completed, the work is automatically moved up and measured, and another cut made.

Automatic miter cutting is just one of many exclusive universal features of these band saws. Designed to utilize every advantage of high speed steel band blades, MARVEL No. 81 Series Band Saws can handle almost any conceivable sawing job—from the smallest, most delicate work, up to 18" x 20" shapes.

Only the MARVEL No. 81 Band Saws have the "SURE-LINE" Automatic Accuracy Control (basic patent applied for) which literally steers a blade to make a straight cut. This unit extends usable blade life as much as 50%.

MARVEL No. 81 Series Band Saws are proving themselves daily, as the most versatile machine tools in production metalworking plants.

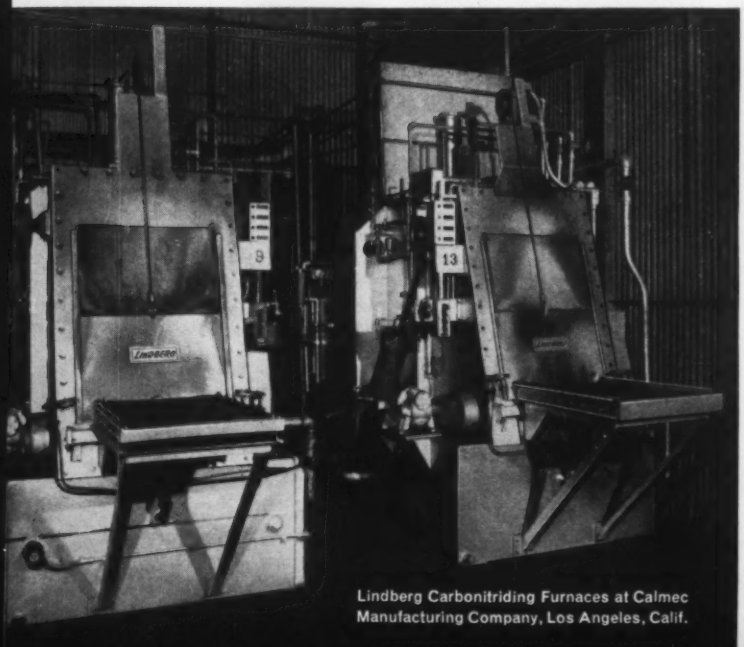
For complete details, or a demonstration of MARVEL Sawing Equipment, write: Armstrong-Blum Manufacturing Co., 5700 W. Bloomingdale Ave., Chicago 39, Ill.

MARVEL *Metal Cutting* SAWS
Better Machines–Better Blades

J. F. McINTYRE tells why CALMEC always looks to Lindberg for heat treating equipment

Left, S. E. Summers, Chief Design Engineer and at right, J. F. McIntyre, Executive Vice-President, Calmec Manufacturing Company, Los Angeles. In the Middle, J. E. Krickl, Western Sales Manager, Lindberg Engineering Company.

"When we have heat treating problems we like to get the Lindberg man right in the middle of them. We know Lindberg men are heat treating experts and the best source we have for advice on the most practical and efficient equipment to satisfy any heat treating requirement. As a result we've bought lots of Lindberg equipment in the past few years. We like it and the fact that we are continuing to buy it proves that the Lindberg man's advice has been sound."



Lindberg Carbonitriding Furnaces at Calmec Manufacturing Company, Los Angeles, Calif.

Mr. McIntyre has certainly backed up the above words with deeds. Over the past few years, Calmec, a leading manufacturer of precision tools, parts and missile system components, has installed twelve electrically heated furnaces, six gas-fired furnaces and four atmosphere generators—all Lindberg! And we hope there are more to come. If you have any product or process in the metal or ceramic field requiring the application of heat it would be a good idea to get the Lindberg man in the middle right away. You can depend on his experienced help and Lindberg's engineering and design know-how to provide exactly the right equipment for your need. It's easy! Just get in touch with your Lindberg Field Engineer (see your classified phone book) or write us direct. Lindberg Engineering Company, 2452 West Hubbard Street, Chicago 12, Illinois.

Los Angeles plant: 11937 S. Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg Ltd., 15 Pelham Ave., Toronto 9, Ont. Also, Lindberg plants in Argentina, Australia, England, France, Italy, Japan, South Africa, Spain, Switzerland and West Germany.

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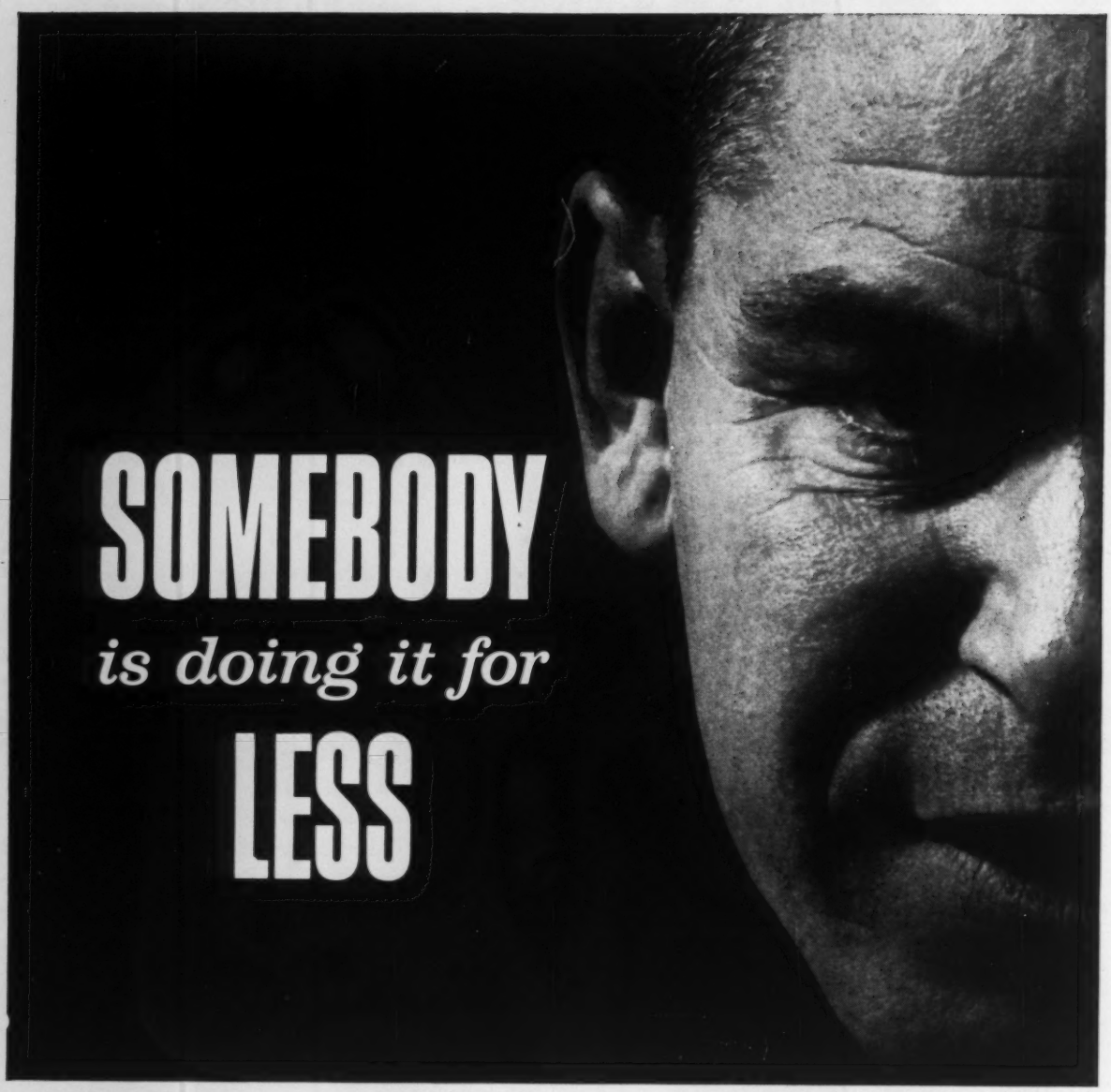
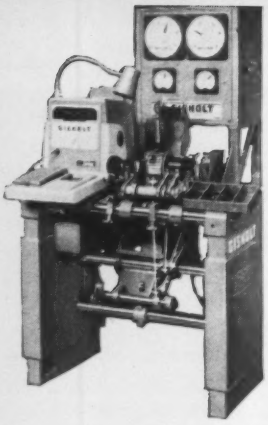


SOMEBODY *is doing it for* LESS

Gisholt MASTERLINE® 1S Balancer Shown with separate unbalance location (angle) and amount meters for each correction plane. Readings hold until corrections are made. Measures vibrations down to .000025"—offers complete plane separation—needs no special foundation—correction planes can be inside or outside of work supports. Standard models available for work ½ oz. to 300,000 lbs.

New HS line handles miniature, high-speed parts—impellers, armatures, gyros, self-driven assemblies—measures vibrations down to .000002".



If you have not analyzed your balancing methods in terms of cost reduction as others have, you're losing profits.

If you rely on operator skill or judgment, accuracy suffers, time is lost, reject rates or field failures are high. With Gisholt balancers, guesswork is eliminated, exact angles are indicated, and unbalance is quickly shown in terms of the correction method used. One man quickly locates, measures, corrects and inspects for balance in one handling—saving operations.

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Above-ground penstock section of USS "T-1" Steel winds downward from Whiteman's Pond at 50 degree maximum slope angles for 1,400 feet and approximately 50 degrees in the 220-foot tunnel at the bottom. Water will have a head of 905 feet and drive a turbine to produce 50,000 KW of electric power.

Calgary Power installs first USS "T-1" Steel penstock in America

Near Chinaman's Peak in the Canadian Rockies, Calgary Power, Ltd., has completed the first penstock in this hemisphere built with USS "T-1" Steel. The 1,601-foot-long, 8′-diameter penstock is part of their "Spray No. 2 Project" to produce more hydroelectric power for the Calgary Power System in Alberta, Canada.

Montreal Engineering Co., Ltd., who recognized the value of USS "T-1" Steel as an excellent constructional alloy steel for such applications as high head penstocks several years ago, proposed its use when the design work started. Their engineers specified USS "T-1" Steel for this penstock because the steel's minimum yield strength of 100,000 psi made possible nearly a 50% savings in the amount of steel required. This saving helped to reduce substantially the transportation and erection costs that would have been required had structural carbon steel been used in this mountainous location.

In the new Calgary penstock, 500 tons of USS "T-1" Steel plate $\frac{5}{16}$″ to $\frac{3}{4}$″ thick were used by Dominion Bridge to fabricate the segments, or "cans" in its Calgary plant. These segments are 8′ to 7′ in diameter.

It was significant that the penstock was designed to a 37,000 psi unit working stress (or approximately 41,000 psi unit stress at 90% joint efficiency). This is more than 28% greater than the ASME code case 1204-4 allows for pressure vessels fabricated of "T-1" Steel in the United States.

USS "T-1" Steel was selected for its exceptional strength and toughness, even at very low temperatures, and its ready weldability. What's more, it eliminates the cost of stress relieving. Write for the complete story to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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This mark tells you a product is made of modern, dependable Steel.

USS United States Steel

Towering five stories high, this vertical cooling tower forms a vital part of United States Steel's spectacular new heat treating facilities shown on the next two pages. The forging is placed on a stool which can be rotated. Cooling is accomplished by the use of air or water, as required.

PLEASE LIFT FLAP

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From the cradle to the lathe

New vertical heat-treating facilities handle world's largest rotors

How would you handle a forging that starts out as a 521,000-pound ingot and ends up as one of the world's largest generator rotors weighing 114 tons?

To accommodate forgings like this at its Homestead Works, United States Steel has installed seven new vertical heat-treating furnaces, a cooling tower and a unique "upender" cradle which tilts these large forgings with ease to a vertical position for crane pick-up. The new furnaces rise 25 feet above, and extend 25 feet below the floor. They can accommodate turbine and generator rotors with an overall length of 45 feet maximum and a maximum body diameter of 60 inches.

The vertical heating and cooling equipment allows large rotors to be uniformly heat treated in the upright position after they have been forged and machined.

One of the outstanding jobs for the new equipment was heat treating some of the largest generator rotors ever made. One of these is shown below being machined in the 120-inch lathe after it received its heat treatment. (The smaller rotor suspended from the crane in the big picture at the left is a different forging.)

In forgings such as these, heating and cooling operations must be carefully controlled to assure proper structure in the steel. Using the skill that only time and experience could give him, Al Sauer, a veteran in our Homestead Works, supervises the careful heat treating of these forgings. After heating, they are transferred to the 50′ high cooling tower where they are cooled at controlled rates. Then they go back for further machining, testing, boring, more heat treating, final machining, sonic inspection, and shipment.

United States Steel makes many forgings for all kinds of applications. Here, a team of experts supervises and controls every step of forging production. Let them handle *your* next order. For more detailed information about USS Quality Forgings, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

United States Steel Corporation, Pittsburgh • Columbia-Geneva Steel, San Francisco • Tennessee Coal & Iron, Fairfield, Alabama
United States Steel Export Company

Shown here are four of the seven new vertical heat-treating furnaces, housed in a modern 125 foot high building, that give United States Steel the ability to handle the largest generator and turbine rotor forgings that can be made.

One of the world's largest generator forgings being machined in our 120-inch lathe. After final machining, it weighed 114 tons.

USS United States Steel

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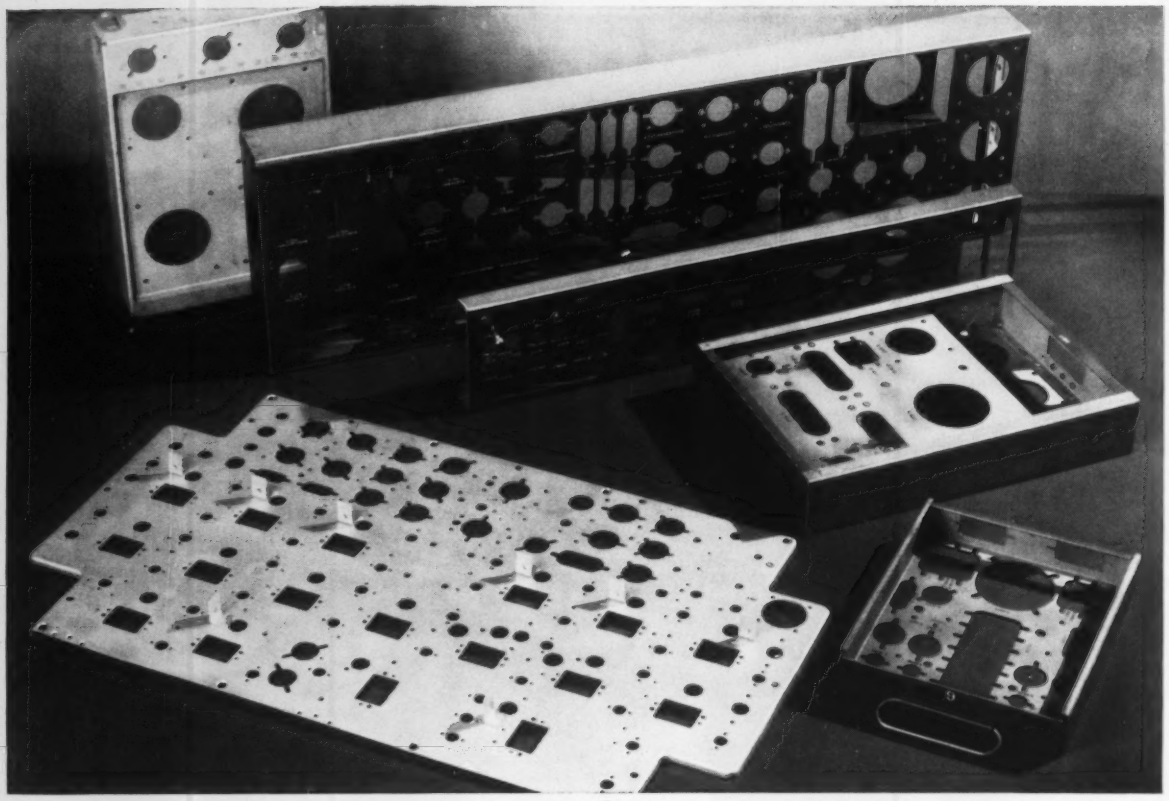

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With the new improved STRIPPIT 15-A Fabricator, complicated patterns of round and shaped holes can be produced quickly and accurately in sheet material. A high speed punch press that enables you to produce finished pieces directly from drawings, the versatile STRIPPIT 15-A eliminates slow "in-between" tool designing and die making... saves you days or even weeks of valuable time.

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Columbia-Geneva Steel Line showing the exit end looping tower.

• Three Annealing Lines by Aetna-Standard Division of Blaw-Knox have been installed in these divisions of United States Steel Corporation—Tennessee Coal and Iron at Fairfield, Alabama; United States Steel at Gary, Indiana; and Columbia-Geneva Steel, Pittsburg, California. The lines have many design features to improve tension control and tracking. High furnace speeds result in better production, quality and yield. A free loop before and after the furnace makes strip tension control much more accurate. At the entry and exit ends, loop towers provide abundant strip storage to insure constant furnace speeds. Scrap handling at the entry end has been improved. The lines handle coils up to 36,000 pounds, 72" maximum diameter and 38" maximum width. Maximum line speed—1500 f.p.m. For information write Aetna-Standard Division, Blaw-Knox Company, 300 Sixth Avenue, Pittsburgh 22, Penna.

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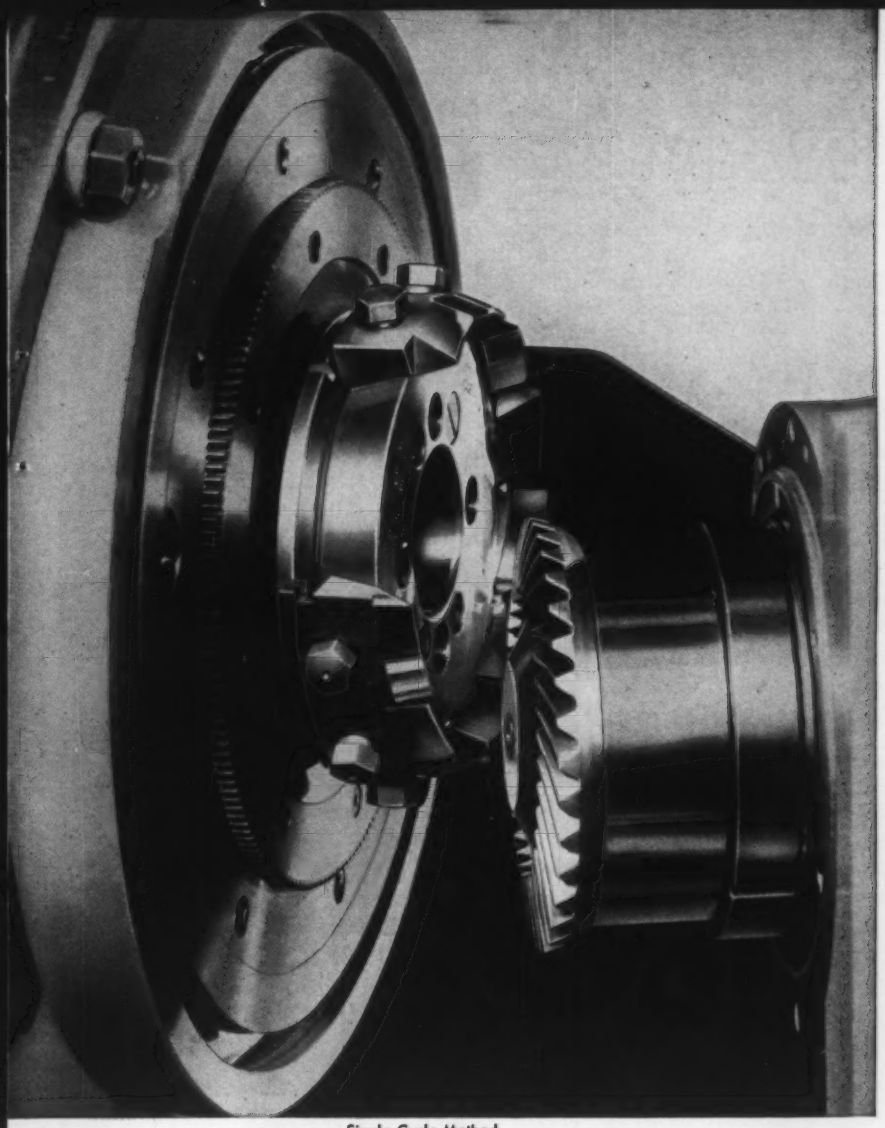
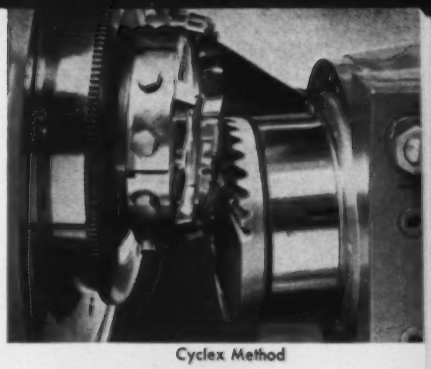
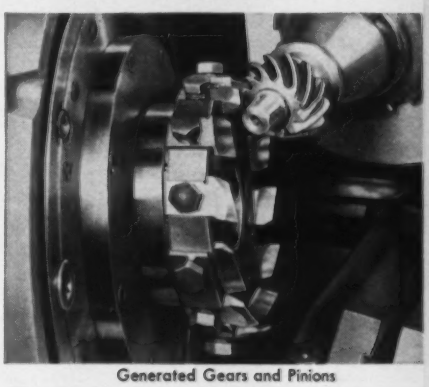


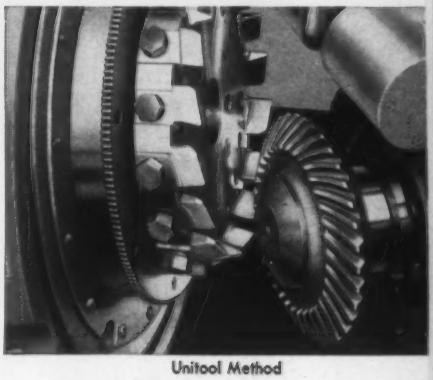
Single Cycle Method



Cyclex Method



Generated Gears and Pinions



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Cut gears with *four* different methods on *one* machine

If you expect your gear needs to change over the years you'll appreciate the exceptional versatility of the Gleason No. 108 Hypoid Generator. With this one machine you can cut both gears and pinions by four different methods:

Single Cycle® Method. Using this method you can cut nongenerated gears four to five times faster than previously possible on machines of this type. Cradle and work head are locked in position. The last rotation of the Single Cycle Cutter finishes both sides of a tooth space. You cut the mating pinions on the same machine using the conventional single-roll Generating Method.

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Generated Gears and Pinions. You can produce both gears and pinions on this machine with the Generating Method. Here, a relative rolling motion takes place between gear or pinion and the rotating cutter.

Unitool* Method. If you want to cut small quantities of spiral bevel, Zerol® bevel, or hypoid gears with a minimum of tooling, you can use the Unitool Method. You cut both gears and pinions with a single cutter. This method is particularly useful for experimental gears for prototype work.

The No. 108 Generator cuts gears up to 8½" diameter at a 10:1 ratio and to a maximum of 4 DP. You can get the same versatility in cutting larger gears with the No. 118 Hypoid Generator which handles gears up to 18" diameter, 10:1 ratio, to a maximum of 2 DP. A third model, the No. 2 Hypoid Generator, cuts gears up to 33" diameter at 10:1 ratio, 1½ DP.

Send for free bulletins on all three machines.

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METALGRAMS

UNION CARBIDE METALS

. . . news of "Electromet" ferroalloys and metals

MARCH, 1961

NEW COLUMBIUM ALLOY -- In recent months, interest has increased in columbium-treated carbon steels for structural applications. Small amounts of columbium sharply increase the yield and tensile strengths of these steels by promoting a fine-grained structure. The element also improves weldability. Highly soluble columbium additions to these steels can now be made with new high-silicon ferrocolumbium. By dissolving faster than regular ferrocolumbium, the new alloy promotes improved uniformity and control of columbium in steel. Ask your Union Carbide Metals representative for further information.

* * *

ZIRCONIUM -- AN ACTIVE ELEMENT -- Zirconium added to steel readily combines with oxygen, sulphur, and nitrogen. It either removes these elements from the bath or renders them less harmful. For example, zirconium reduces the hot shortness of high-sulphur steels by tying up sulphur. It reduces age-hardening in deep-drawing steels by combining with nitrogen. Zirconium is also a strong grain refiner when more than 0.10 per cent is added to steel. Contact your Union Carbide Metals representative for more information. Also, ask for "The Elements That Surround Us: Zirconium" in the Fall 1960 issue of UNION CARBIDE METALS REVIEW.

* * *

A WORLD-WIDE SEARCH -- The search never ends for high-grade ores, from which ferroalloys are made. Exploration teams of Union Carbide Ore Company search all parts of the world -- sometimes through tropical jungles, arid deserts, and unexplored rivers. Their goal: to discover new ore deposits to satisfy the growing demand for ferroalloys. Union Carbide's integrated mine-to-furnace operations assure a continuous supply of ferroalloys...when you want them. For the full story, write for the article, "From Earth to Hearth," in the Winter 1961 issue of UNION CARBIDE METALS REVIEW.

* * *

THIS 'N' THAT -- Use of ferroalloys in pre-weighed bags allows: lower handling losses, improved inventory control, more accurate alloy additions, and better control of steel composition. Write for F-20,121 and F-20,138... "Simplex" low-carbon ferrochrome is a vacuum-processed alloy for stainless steel. It features rapid solubility, low price, and extremely low-carbon content. Write for F-20,118...Manganese costs for stainless steel can be sharply cut with ferromanganese-silicon. Write for F-20,093.

* * *

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. In Canada: Union Carbide Canada Ltd., Toronto.

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GOVERNMENT TRUST BUSTERS, to an "increasing extent," are taking a dim view of corporate efforts to penetrate new markets by buying out or merging with existing companies in other industries. This is reported by Michigan U. analysts. Prof. C. E. Griffin defends these mergers as "good for competition and for consumers:" New companies often undercut existing prices.

U. S. AUTOMAKERS' VICTORY over foreign cars last year was a double-barreled one. Foreign car registrations decreased about 19 pct in 1960 to 498,785 units from 614,131 in 1959. Actual shipments of cars dropped even more steeply; 444,474 from 668,070. But U. S. auto exports increased 24.3 pct over the 116,520 units shipped in 1959.

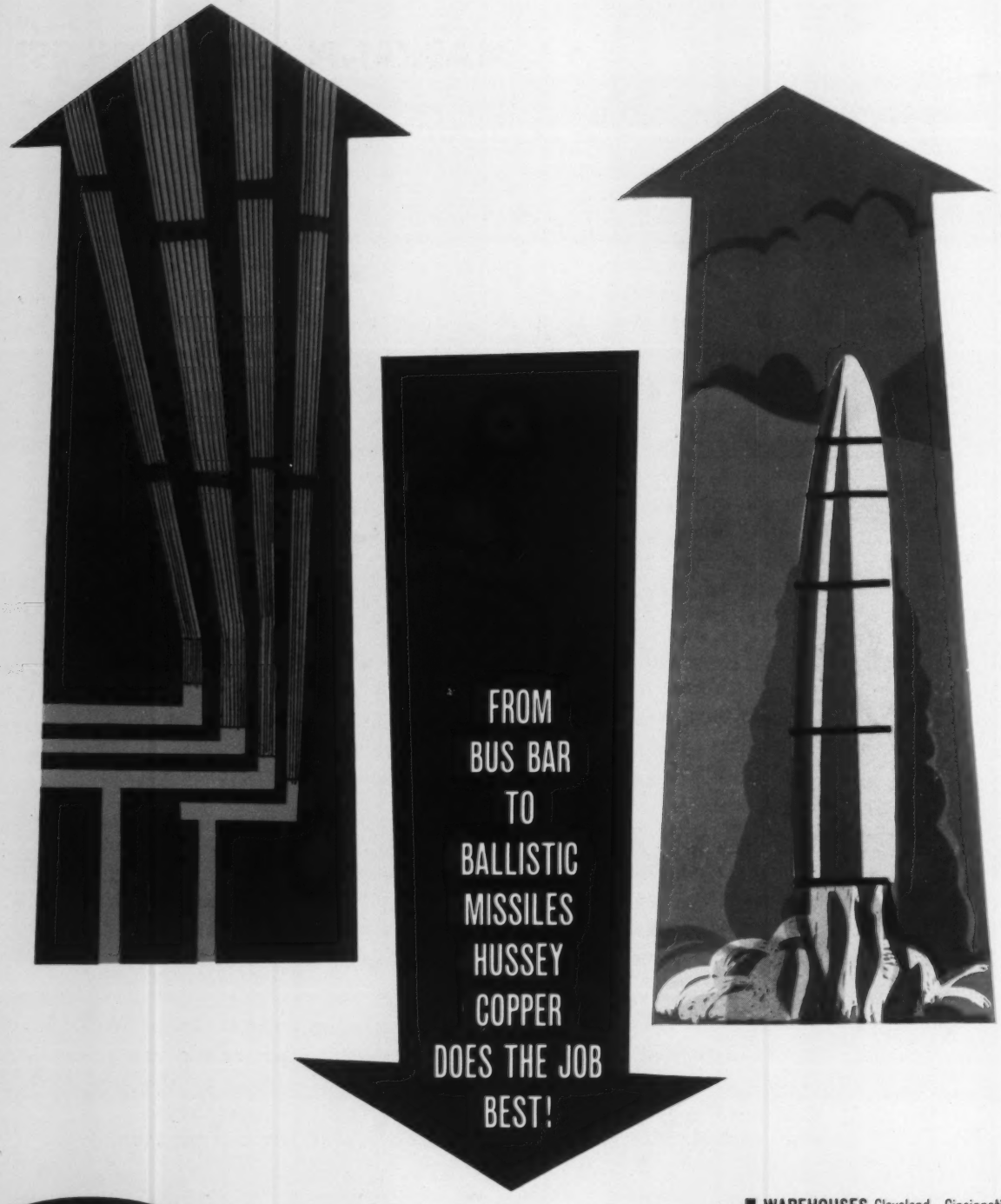
FACTORY-MADE HOMES continue to edge further into the housing market. Latest figures of the Home Manufacturers Assn. show that 1 out of every 9 new single family houses now put in place is factory-made. This ratio has doubled in the past 10 years. An estimated 400 companies are producing these manufactured homes.

SELLING PRODUCT VALUE is growing as a market approach. This is the view of one purchasing management consultant. He reports "greatly increased" requests for his services to train salesmen in this approach to buyers. He says that salesmen who talk the "old language of low-price" are losing sales.

ALUMINUM SHIPMENTS by domestic producers to consuming industries in 1960 amounted to 4.66 billion lb. This is about 6 pct under the record total of 5.0 billion lb. in 1959, according to the Commerce Dept. Building and construction, and transportation equipment accounted for more than 40 pct of the consumption.

SPENDING FOR SERVICES now makes up 40 pct of total consumer purchases. Service spending also accounted for 60 pct of the overall 1959-60 increase in personal buying.

THE INDEX OF THE AMERICAN GEAR MANUFACTURERS ASSN. shows an increase of 2 pct in January over December of last year. The January index was 220.8 (1947-49=100) for new bookings. This is below the 1960 average of 235.5. The index of shipments rose in January to 227.3, up from 220.0 in December of last year.



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House Automation Hearings: Short Workweek Sounding Board

A subcommittee opened hearings last week into unemployment and the impact of automation.

It gives labor a platform from which to seek a 32-hour week without a cut in pay.

By H. R. Neal

■ The large industrial unions are leaving little room for speculation as to their next major goals.

The latest clues came from David J. McDonald, president of the United Steelworkers of America, as he opened testimony before the House Subcommittee on Unemployment and the Impact of Automation.

"We need a shorter workweek without a reduction in pay," he says.

In addition, he indicated that his union would push for steel industry support of a program to retrain workers who are displaced by automation.

Among Friends — The demands aren't new. But the atmosphere in which they are being made is the friendliest that unions have met to date.

Rep. Adam Clayton Powell (D., N. Y.), chairman of the parent House Labor Committee, believes a 32-hour workweek may be needed to ease unemployment and spread work.

In opening remarks at the hearing, Mr. Powell set the scope of the subcommittee's investigation:

"There isn't any aspect of unemployment that this committee isn't authorized to look into—automation, consideration of the 32-hour workweek, or the effect of imports on unemployment."

Common Problem—Rep. Elmer J. Holland (D., Pa.), subcommittee chairman, is equally sympathetic. He had suggested the automation investigation four years ago.

Selection of Mr. McDonald as lead-off witness was no accident. Mr. Holland is a Representative from the Pittsburgh area. He is also a member of USWA Local 1272. For these reasons, the Congressman is well acquainted with the problems faced by workers in the mass-

STEELWORKERS: Steelworkers' president McDonald talks with subcommittee chairman Rep. Elmer J. Holland (D., Pa.), who is also a member of USWA.

RIGHT-HAND MAN: David Feller, former associate of Labor Secretary Goldberg, is the new right-hand man and legal counsel for David J. McDonald.

"The most important consequences of automation on society are ones that aren't even recognized today."—

employment industries.

Mr. McDonald's testimony deals only with the problems of the Steelworkers. But it carries the weight of industrial unions in general. They all have similar problems.

Higher Than Average—The steel labor chief pointed out that the layoff rate in the steel industry is more than 29 pct. The seasonally adjusted national rate is 6.8 pct.

He gave two reasons for this:

First, the steel industry feels a recession earlier and harder than does most of the economy. Manufacturing capacity is being used at a rate of about 75 pct now; the steel industry is operating at slightly more than 50 pct.

Second, "technological unemployment" has been brought about by new methods of making steel and the growing use of automation.

Fewer Man-Hours — To emphasize the importance of the second cause, Mr. McDonald cited the similarity of steel production and shipments for 1950 and 1960.

In 1950, ingot output was 96.8 million tons, finished steel shipments totaled 72.2 million tons. Preliminary figures for 1960 place output at 99.2 million tons and shipments at 71.1 million tons.

"Yet, in the year 1960, production worker employment in steel averaged 461,800, compared with 540,000 in 1950 — a decline of 80,000. The average workweek was 35.7 hours in 1960, compared with an average of 39.0 hours in 1950," the union leader said.

For Automation—However, Mr. McDonald insists the Steelworkers are not against automation. In answer to a question of whether or not the union could forbid introduction of automation equipment, he replied: "Absolutely not. And we don't want this right. We want automation equipment. But we want a share of the benefits, too."

One of these benefits is a shorter workweek with no reduction in wages.

"This will bolster purchasing power and provide additional jobs. This vital objective can be pursued on both the collective bargaining and legislative fronts. It must come, and soon, or the present temporary —we hope—job loss in steel and the economy may well become permanent," he said.

Need Legislation — Mr. McDonald pointed out that "only human beings have purchasing power." And, he said, "it's an absolute waste of money" to build an automated steel plant "unless human beings can purchase the end results of that factory."

Mr. McDonald doesn't see much chance of winning a shorter workweek through collective bargaining. "A few years ago I would have said it was possible. But the change in steel leadership would now take us back to the 12-hour day," he charged. Consequently, he believes Federal legislation is needed.

But even this, he claims, would not be enough. There is still the problem of what to do about workers whose jobs have been eliminated entirely. These persons will require retraining and other assistance.

Jobs and Training—"One part of the solution is an increase in job opportunities elsewhere," he said. But displaced workers can't always fill new jobs immediately. "The problem of retraining and transition may be as great as the problem of job creation."

It would be easy, he said, to ask the government to take on this task. And it should assist. But it is also up to private industry to "shoulder its share of this burden."

He called for industry to join the union in "developing plans for dealing on a private, but broadly cooperative basis," with the problem.

"Detroit Automation" — Another witness, John Diebold, president of The Diebold Group, a world-wide organization of management consultants, agreed that retraining should primarily be a joint union-management undertaking.

But he minimized the effect of "Detroit automation"—the linking together of machines. "I think there are more people employed in building computers than have been replaced by them," the automation expert told the subcommittee.

However, he warned, automation is less than 10 years old, and "we haven't begun to feel the real effect of it."

Import Probe — "The most important consequences of automation on society are ones that aren't even recognized today," Mr. Diebold said. "The rate of change of progress is going to increase."

Just how deeply the Holland subcommittee will probe unemployment and automation is not clear.

Foreign competition as a cause of unemployment will be treated separately from the automation question.

Likely Results—But there will be recommendations for legislation to ease the impact of automation. A shorter workweek stands a good chance of being one recommendation. This will meet stiff opposition from the Administration. Federal assistance in the retraining of displaced workers will also be a recommendation. And this should meet a favorable reception from Congress.

In negotiations, the large industrial unions such as the United Steelworkers, the United Automobile Workers, and the International Association of Machinists, will undoubtedly press for similar aid from industry.

What's Ahead for U.S. Exports?

Leaders Say Record Pace Must Be Expanded

Last year was a record year for U.S. exports. Government "concessions" are credited with the sharp rise.

But business leaders say exports will have to be expanded more by 1970 if new markets are to be gained.
By K. W. Bennett

▪ U. S. exports are gaining in world markets, but more expansion is "necessary."

That's the opinion of top executives attending the Chicago World Trade Conference last week. In a nutshell, they say: Business finally got Federal concessions for exports last year. The results were explosive.

L. F. McCollum, president, Continental Oil Co., says, "During the past year exports have been and will continue to be the most significant expansionary force in the private sector of our economy."

The Totals—Free World nations exported $97 billion in 1960. The U. S. exported a record $19.6 billion—or 18.3 pct of the total. Also, American exports were gaining in the second half when they hit an annual rate of $20 billion.

G. W. Ball, Under-Secretary of State for economic affairs, points out that merchandise exports topped imports by $4.7 billion last year.

But even more must be done. Continental's Mr. McCollum feels exports must be stepped up by 45 pct by 1970 for the U. S. to hold its relative position in world markets. This isn't a hard target. National export volume grew 108 pct in the 1950's against a gain of 77 pct in the Gross National Product. This 45 pct gain would mean at least one million more jobs in the U. S.

New Factors — While the conferees were cautious, they agreed that new factors give businessmen advantages not previously enjoyed.

U. S. price advances in the 1950's haven't matched the relatively higher price boosts abroad. Low taxes and war damage subsidies are phasing out overseas; foreign wages are rising.

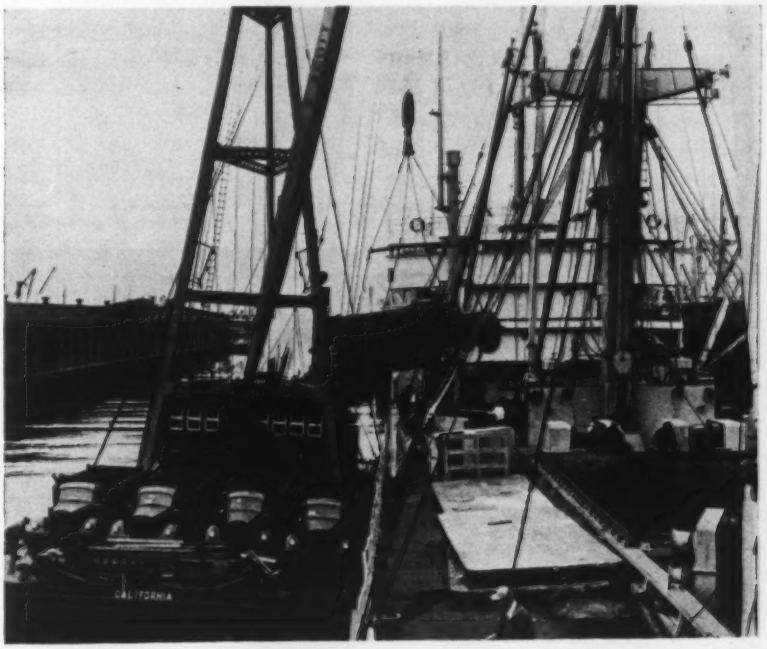
Then, too, the Export-Import Bank has been offering short-term insurance against political losses since last spring. This enables U. S. exporters to carry foreign buyers up to five years.

Also, the first commercial export credit insurance was offered in 1960. Continental Casualty Co. of Chicago covers losses other than political. Terms are also as long as five years for capital goods. Unlike Eximbank insurance, companies can also insure goods made in overseas plants.

Easier Marketing — And several government agencies now exist to make foreign marketing easier. Some agencies: Organization for Economic Cooperation, still under consideration by the Senate; Dept. of Commerce's Export Expansion Program.

On top of all this, common markets are offering more powerful buying groups. R. W. MacDonald, international vice-president, Burroughs Corp., analyzes these markets: In Europe, 270 million customers; and 180 million Latin Americans. The Latin American market will grow to 600 million persons in the next 30 years.

Big Problems—But foreign buyers are aware of anything that smacks of U. S. protectionism for its manufacturers. This is a big problem.



EXPORTS UP: Last year brought record shipments of U. S. exports. Here a truck is loaded aboard an Isbrandtsen Co. ship. Business leaders say American exports will have to expand even more in the next decade.

Recession Stirs New Interest In Inventory Management

The heavy toll on business made by "inventory adjustments" has awakened new top management interest.

Needed for better inventory control: Written policies, good men, accurate sales forecasts. By J. D. Baxter

■ As a business force, inventories have moved into the spotlight. They have been blamed for recessions, credited for recoveries. They are generally accepted as a major factor in business circles.

In individual companies, poor management of inventories can cause production breakdowns, lose customers. And a whole year's profits can be wiped out in a single inventory adjustment period.

Nearly 30 pct of the assets of the average U. S. industrial company are tied up in inventories.

Yet, the National Industrial Conference Board, after a survey of inventory management in over 100 well-run U. S. companies, concludes: "Very few companies are completely satisfied with their method of managing inventories."

Problem Grows—Inventory specialists point out that the problem is growing more acute as automation and productivity gains breed bigger, more volatile stocks.

One man who has thought a lot —and done a lot—about the problem is Donald F. Hess, executive vice president of the American Production and Inventory Control Society. APICS is a group of 1700 inventory and production control men (40 pct of inventories are "in process") representing every industry in the country.

As manager of production planning at Bearings Co. of America, Mr. Hess knows his field.

Says Mr. Hess: "Basically, the cause of so much loose inventory management is lack of management concern."

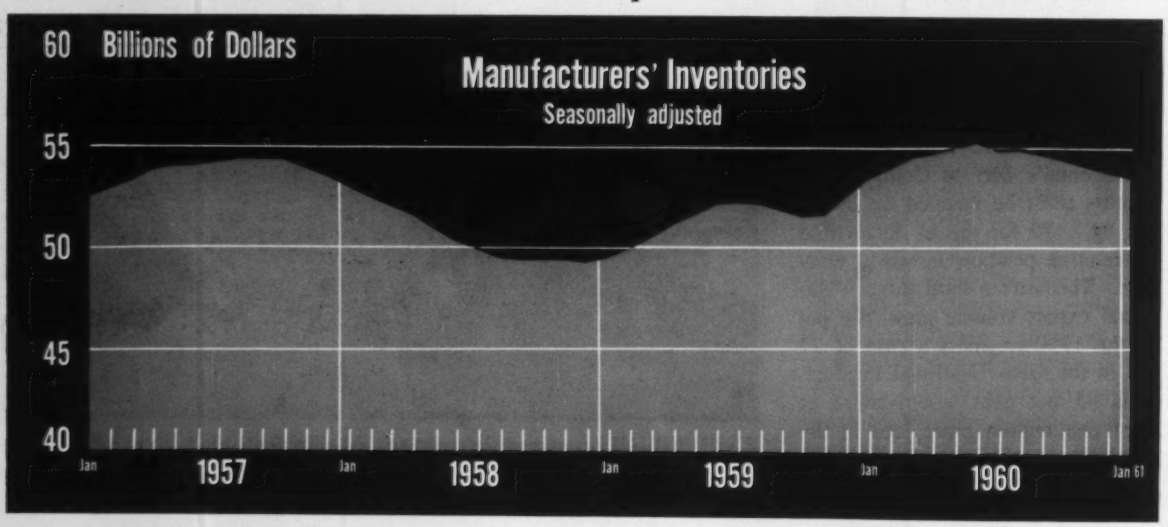
Loose Policies—Mr. Hess, who has written and lectured widely on inventory management, adds: "The proof of this interest lack is apparent in the fact that few companies have written policies on the handling of inventories. Policy is often verbal, and made up as situations develop."

Mr. Hess sees a turn in the road. He feels the recent and present business drought has done much to publicize the key role of inventories in the economy. Managements are showing a new awareness.

Society Grows—Mr. Hess sees an indication of this awareness in the founding and growth of APICS. Prior to the society's founding in 1957, there had been no national group singularly concerned with inventory management. With a present membership of over 1700 members in 46 chapters, the society has been termed the "fastest growing professional society in the U. S."

APICS features an active and ex-

Business Inventories: They Can Make or Break



tensive education and research program. Mr. Hess is largely credited with setting up this program.

Alert inventory men are capitalizing on the recession-born interest in inventories by management. They are breaking out of their world of charts and formulas with private meanings. Mr. Hess cites just one recent inventory formula approach being used. Termed ROCE (return on capital employed), this language is reaching the ears of top management.

New Language — Inventory men are now talking about capital return and customer relations aspects of inventories. These are two areas that have a "positive" appeal to company presidents. This is the "language of the ledger."

Mr. Hess makes a point of selling the idea of "improved sales forecasts" as a springboard to better inventory management in companies.

One major suggestion that Mr. Hess makes for better sales forecasts is that inventory and production control men be included in the group setting up such forecasts. He notes that there is greater "integration" in companies today. "Department lines are being erased," he says.

"All year, inventory and production control men work with controllers, with purchasing agents, and with sales management. They have a common interest in developing sound sales forecasts. They all can contribute to better sales forecasts."

Aid in Forecasts—As an example, Mr. Hess contends that inventory specialists can brief market researchers first-hand on "unsold" stocks and rate of movements of stock by type and model breakdown.

The NICB report on inventory practices notes a trend in the direction advocated by Mr. Hess. Among the well-run companies surveyed is noted a "growing practice of establishing a common forecast for use in financial and production planning as well as sales administration."

Can Industry End Profit Slump?

Last year net earnings of manufacturers slipped 2 pct below 1959 levels.

But recession is not the only reason. The profit slump is 10 years old. And earnings lag behind the economy.

■ When does the turn come in the profit-squeeze story?

The March letter of the New York First National City Bank reports on a tabulation of 1479 manufacturing companies. Net income for these companies declined 2 pct in 1960 from 1959. This, despite higher sales reported by most companies.

The bank's summary: "Corporate reports for 1960 reveal the widely divergent experiences of American business in a new and challenging environment. Cost pressures continued to rise while competitive conditions forestalled needed price increases or, in many cases, led to price cuts.

"Thus, while the nation's economy attained new records in production and sales, most corporations enjoyed little or no improvement in earnings from 1959."

Metalworking Drops — Some of the steepest earnings drops were made in metalworking lines. Machinery category earnings were down 23 pct. Electrical equipment was down 11 pct. Iron and steel and nonferrous metals were down 3 pct. The earnings of 294 companies in the category "other metal products" were down 10 pct.

Autos and parts were up, but less than one pct. And "other transportation equipment" was down 6 pct.

The grand total for over 2300 companies in all categories showed a 2 pct earnings gain in 1960 over 1959.

Not Just Recession—These figures show that producing more and selling more is not the answer to making more profits. And this is not just a tale of the current recession. The bank's 1960 profit-squeeze figures top off a solid decade of poor profit records by U. S. industry, particularly in manufacturing.

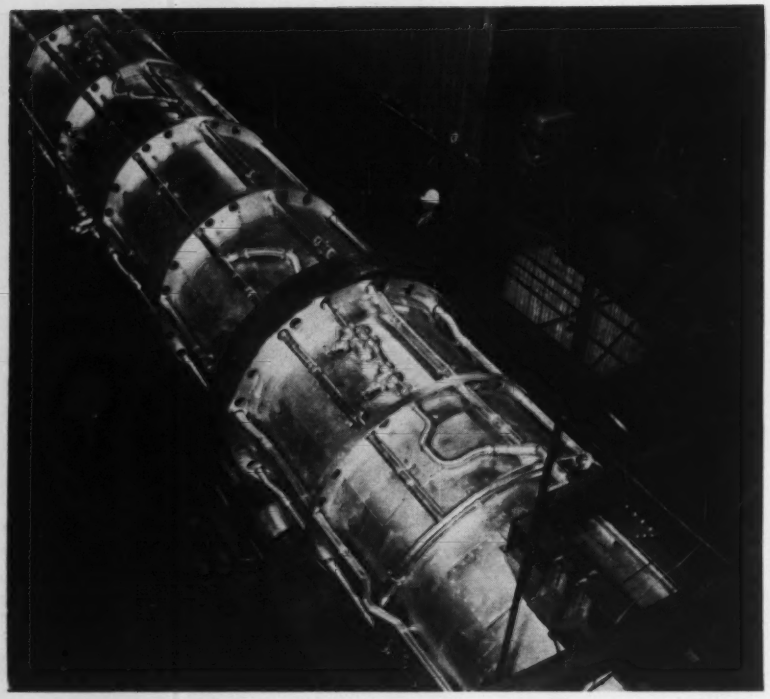
According to the Securities and Exchange Commission, the profit rate of U. S. manufacturing companies has stayed on dead-center. And done so in the face of an overall expanding economy.

What's the Answer? — The big question is, of course, what can be done to get profits off dead center. If this is a condition here to stay, and 10 years of it is heavy evidence of permanence, then how can industry adapt?

The question implies a national problem as well as a business one. Walter W. Heller, head of the Council of Economic Advisers, points to economic growth as the solution to most of the economic problems in the U. S. He sees the need for a 4½ pct annual rate of growth. Much of the steam for this advance must come from corporate growth.

But Gross National Product is already running well ahead of corporate profits.

National View—With cost-push pressures forcing up breakeven points, and with competition keeping a ceiling on prices, manufacturers are in a poor position to shoulder their portion of national economic growth. There is little reason to believe that a bigger GNP will carry corporations along to greater profits.



KEY TO PROCESS: This Lurgi kiln is a key tool at the M. A. Hanna Co. semi-taconite pilot plant. It is 80 ft long and 8 ft in diam.

Semi-Taconite Test

■ The Mesabi iron range's fight for survival stepped up last week. M. A. Hanna Co. opened a $2 million semi-taconite pilot plant at Cooley, Minn., in the west of the range.

Semi-taconite is a low grade ore, around 35 pct Fe. Softer than taconite, it is easier to crush and grind. Non-magnetic, it cannot be pulled from the crushed ore easily with magnetic separators. A costly roasting process, making it magnetic, is necessary.

Past Problems—The ore was long rated too lean to ship directly and too hard to profitably upgrade. But pelletizing and sintering has changed this.

It now seems certain semi-taconite can be made economically feasible.

In its first week, Cooley produced usable 57 pct iron and should soon reach the desired 65 pct range. Problems include: Plugging of pipes; size and types of cycling; and winter shutdowns.

Seeking Method—The target, according to Ben M. Andreas, Hanna's Minnesota Mines manager, is "a successful method to produce semi-taconite into a product that can meet and beat competition on a cost and quality basis."

Building of the plant was made possible by passage of a favorable semi-taconite tax law by Minnesota in 1959.

Unique Systems—Features of the plant are the separation and roasting reduction systems.

In separation, ground ore of ¼ in. to 1½ in. is mixed with finely ground ferro-silicon and water. The heavy ore sinks to the bottom and collects. The lighter siliceous waste floats off.

The heavier material is then put through an 80 ft long, 8 ft diam, slowly rotating Lurgi kiln heated to 1300°F. In this it picks up enough iron oxide to become artificially magnetic. It can later be extracted by electro-magnetic separators.

Commercial Unit—If the pilot plant succeeds, a major commercial production unit will likely be built. A commercial kiln will be about 12 ft diam and 195 ft long, compared with the present kiln's 80 ft.

Such a plant could turn out about 1500 tons of concentrate per day on three turns, compared with 200 for the pilot plant.

Space Savings—At present, the trend is to ship final concentrate without pelletizing or sintering. The mining company apparently prefers train and boat shipping space savings through tightly packed concentrate. It will do the pelletizing elsewhere.

Major items of machinery in the plant include a 1¾ cu yd end loading for crude ore; the kiln; a 35-ton rod mill; 100-ton ball mill; three stages of magnetic separators; special demagnetizing coils; cyclones; filter; and a gas producer.

Electron Beam Furnace Boosts U. S. Capacity

The world's largest electron beam furnace is now operating at Richmond, Calif. It is in a plant of Stauffer Metals Div., Stauffer Chemical Co.

Officially rated at 300 kw, the furnace can refine and cast ingots of refractory metals up to 8 in. in diam and 42 in. in length. It can produce 30,000 lbs a month.

The high output capacity raises total U. S. capacity to produce electron beam refined refractory metals to over 200 tons per year.

Cost Advantage — The electron beam furnace process cuts costs. It does not require a high grade feed stock. And it can be charged with mill scrap, firns, metal powder or sinter.

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INDUSTRIAL BRIEFS

Mammoth Mural—A huge mural of stainless steel is taking shape at the new Western Electric Building in Manhattan. Suggesting the sweep of communications across time and space, it will extend across two walls of the lobby and cover a surface of 1275 sq ft.

Nuclear Growth — Capital expenditures of $500,000 are going into expansion projects of Nuclear Metals, Inc., Concord, Mass., this year. Included are an extrusion press, electron microbeam probe, spectrograph, arc-skull melting and vacuum induction furnaces, and a number of special high temperature furnaces.

Three Contracts—Salem-Brosius, Inc., Pittsburgh, has received orders for furnaces from three companies. It will build a 155-ton per hour pusher-type slab heating furnace and 16 soaking pits for Sheffield Steel Div., Armco Steel Corp., at the Houston plant. For U. S. Steel Corp., it will build a controlled-atmosphere type car furnace for the McDonald Works, McDonald, O. It will erect four coil-annealing furnaces at Midwest Steel Corp. Div., National Steel Corp.

Aluminum Barge — Todd Shipyards Corp., Houston, is building the first aluminum barge in the U. S. for Reynolds Metals Co. It will be leased by Reynolds to Industrial Marine Service, Memphis, to be used on the Mississippi-Ohio River systems.

Pueblo Supply—Linde Co. Div., Union Carbide Corp., is building a new acetylene plant at Pueblo, Colo. It will supply Colorado Fuel & Iron Corp. with a capacity of 1.5 million cu ft per month of acetylene.

Plant Down Under — A million dollar coated abrasive manufacturing plant will be built in Melbourne, Australia, by the Carborundum Co., Niagara Falls, N. Y.

Geared for Move—A new gear research building and pattern shop will be built in King of Prussia, Pa., by Philadelphia Gear Corp. It will be near the company's new manufacturing plant and offices.

Texas Opening—Kaufman Enterprises, Inc., has begun production at its new plant at Kaufman, Texas, near Dallas. It will offer complete fabrication and design services for all types of steel and aluminum structural components.

Bigger Base — W. E. Pipkorn Mfg. Co., St. Paul, has completed its plant expansion. The maker of formed wire products, custom wire fabrications and production aids has doubled its plant area to 12,800 sq ft.

Epps Expands—Epps Industries, Inc., Los Angeles, is doubling its capacity to produce welded steel tubing. A $150,000 program includes installation of a second electric weld steel tube mill.

Fourth for Coast—Electric Autolite Co. will build its fourth West Coast facility at El Segundo, Calif. The aircraft wire and cable plant will have special wire drawing and braiding and coating process equipment.

West Warehouse — Inland Steel Products Co., Milwaukee, opened a new warehouse in San Francisco. It handles complete metal lath products.

Move West—Rogers Industries, Inc., has opened a new plant at Pomona, Calif. The aluminum window fabricating company previously serviced the west from its Hutchinson, Kan., plant.

"How much longer does Johnson's honeymoon last?"

Chicago Bound — Sciaky Bros., Inc., is moving its Los Angeles research division to Chicago. It will centralize research and development and electric resistance welding machine manufacturing.

Three-in-One—Jered Industries, Inc., and its subsidiaries, Jered Equipment Co. and Jered Products, are now located in new quarters at Birmingham, Mich. Specialists in the transmission and application of power, Jered Industries serves the automotive, farm equipment and aircraft and shipbuilding industries.

Sonic Switch—Ultrasonic Industries, Inc., has moved to quadrupled facilities at Engineers Hill, Plainview, N. Y. Robot Metalcraft Corp., a subsidiary, is also located there.

Greater Grating — Klemp Metal Grating Corp. is moving several divisions into new quarters in Chicago. The industrial grating and international divisions are included.

Midwest Move — Sandvik Steel, Inc., has moved its Chicago branch office into a new building at Skokie, Ill. The office and warehouse is now housed in 16,428 sq ft of space.

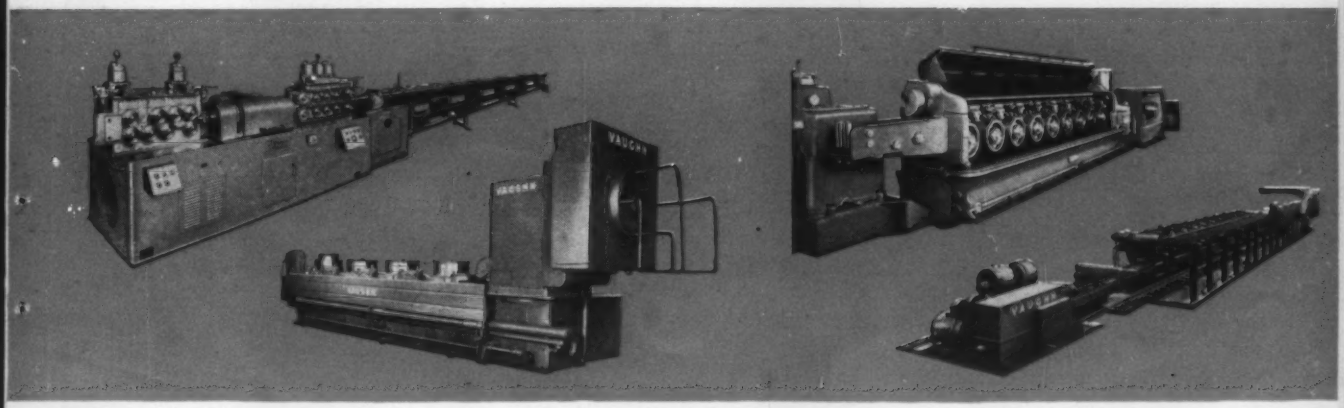
General Grows — General Vacuum Corp., East Boston, has moved to a multi-story building at Medford, Mass. The new plant is specially designed to produce high vacuum systems.

Michigan Change—Detroit Electric Furnace Div., Kuhlman Electric Co., has moved from Bay City, Mich., to Detroit.

Tubular Expands — Tubular Structures Corp. of America and Tube-Strut Corp. have moved into larger office and production facilities in Los Angeles. Two buildings are being used and a third is planned.

Atomic Shield — Michigan Chemical Corp., Saint Louis, Mich., and Haveg Industries, Inc., Wilmington, Del., have teamed to develop a new lightweight atomic radiation shielding.

IF IT'S COLD DRAWN SEE VAUGHN!



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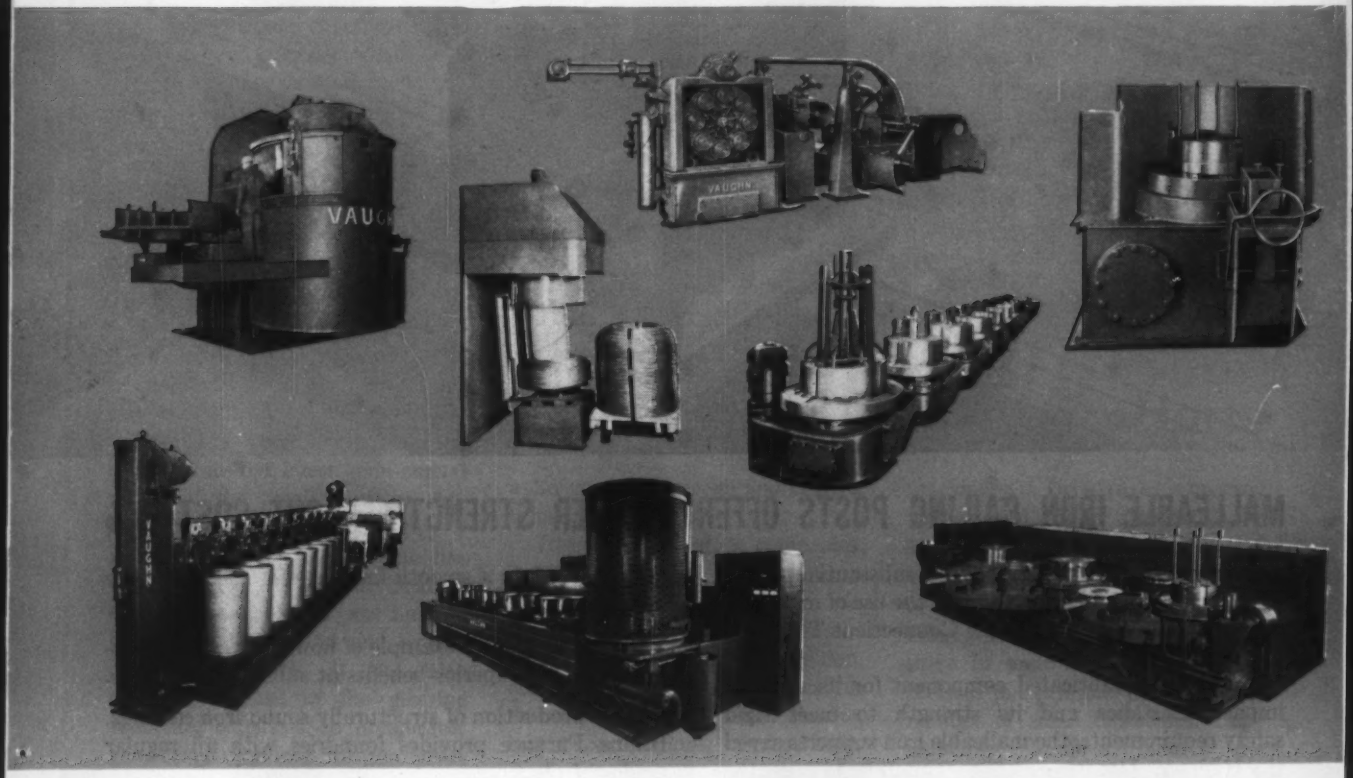

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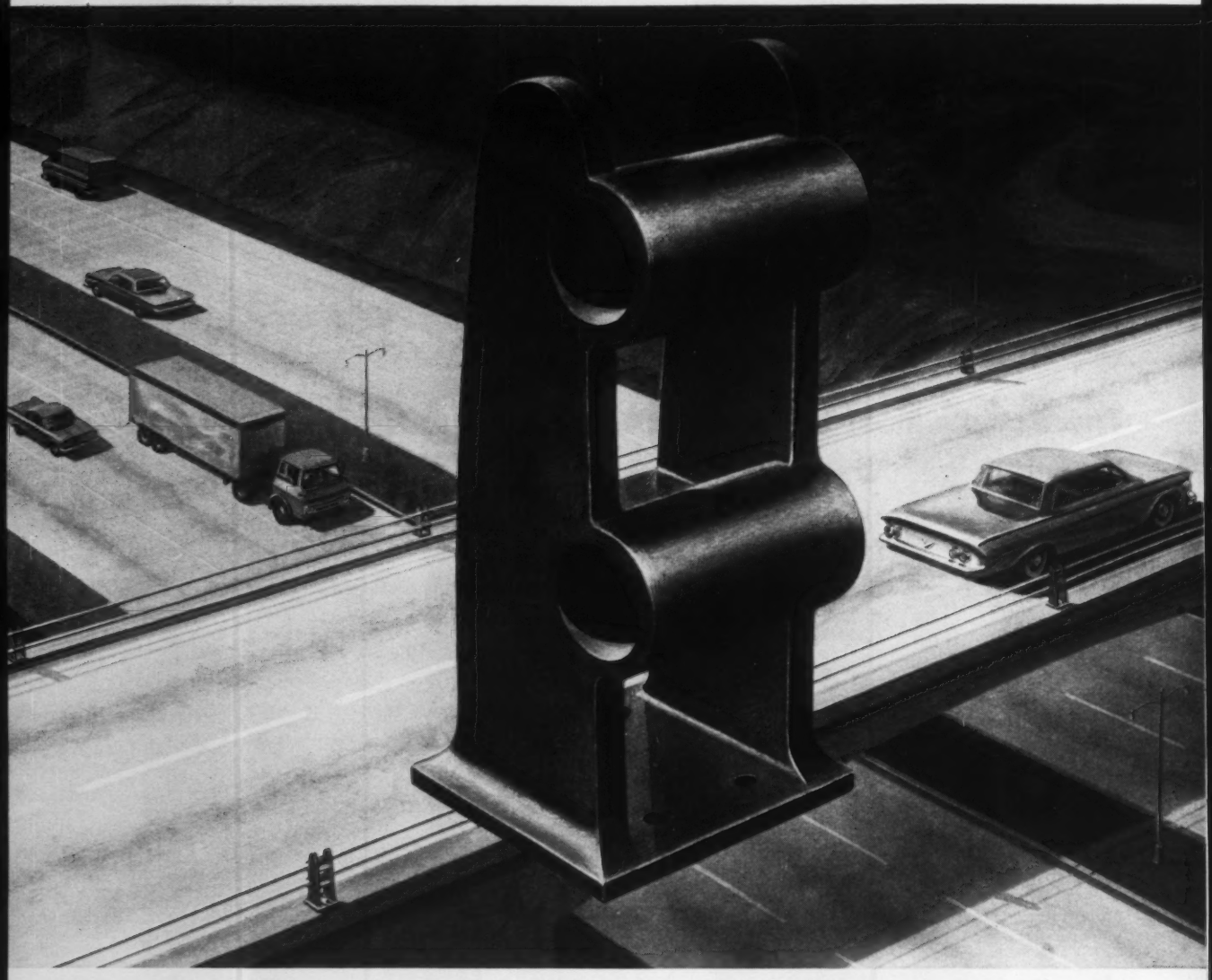

MALLEABLE IRON RAILING POSTS OFFER GREATER STRENGTH . . . CUT COST 13%

A higher standard of safety at a substantial saving in price has been achieved through the use of malleable iron bridge railing posts on the Connecticut Thruway.

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Small Business Meets Change

Long-term trends in small business are important to you, regardless of the size of your company.

Greatest increases are expected in the service industries, retail and wholesale trade, and construction.

■ What are the long-term trends in small business development?

When you consider small business makes up more than 95 pct of the total business units in the U. S., it's important to know.

By many measures, small business is big business. It accounts for more than 40 pct of total business activity. It employs nearly 30 million people.

Recession and Change—That being the case, the health and progress of small business is vital to your interests.

There's a good analysis of the situation in the latest semi-annual report of the Small Business Administration. Not surprisingly, it reveals the small businessman has been affected by general business trends. Small business was hurt by the recession of 1958 and by the present slowdown. It has also changed because of the growing economic emphasis on nondurable goods and services. In the years to come, the swing to services should influence it still more.

For example, Commerce Dept. figures show there were 4.5 million small business firms at the end of the third quarter, 1960. On the basis of expected population growth, it's estimated there will be more than 5 million units by the end of the '60's. About three-fourths of these new businesses should be in retail and wholesale trades, service industries, and contract construction work.

Swing to Services—During the 1950's the income of unincorporated companies dealing mainly in services rose from $6.7 billion to $11.6 billion. The number of these service businesses grew from about 700,000 to around 850,000.

Says the SBA: "Virtually all these businesses are very small. The data shows there were increased opportunities for small business in the field of services. It also shows that the businesses earned more income per unit."

Growth Pattern — The report traces the changes that have taken place since the 1950's. In totals below the figures are for total business units. But bear in mind small business firms are a large portion of these total units—above 95 pct last year.

The number of construction companies increasing sharply in the 1950's. But so did wholesale trade units, finance, insurance and real estate companies.

By comparing changes between 1929 and 1959, you get an even more interesting analysis. There were 1.5 million more companies in 1959 than thirty years earlier in 1929. They break down this way: Retail trade—629,000; services—261,000; contract construction—242,000; and wholesale trade —169,000.

. . . . But Cost Squeeze Hurts

■ So much for growth and change. What about profits?

Together with larger companies, small business has felt the cost-profit squeeze.

Earnings after taxes in the first half of 1960 were $310 million, compared with $418 million for the same period of 1959. Among larger corporations, the earnings drop (after taxes) was from $8.2 billion to $7.7 billion.

Those Hurt Most—"It's difficult to determine the industries where earnings of the smaller manufacturing corporations declined the most. But available data shows large decreases in fabricated metals, machinery, furniture, lumber, leather, and rubber products."

The 1960 falloff in business inventories, homebuilding, and sales of consumer durables hit smaller firms. "The resulting price competition in some lines of goods and services put pressure on a growing number of small businesses. Consequently, business failures increased," the SBA notes.

Through October, 1960, there were 938 more failures than in the same period of 1959. These included: Construction, 419; furniture and home furnishings, 101; and retail automotive, 246, nearly half of them filling stations.

THE VITAL ISSUES Facing Management

IRON AGE Interviews George W. Taylor:

Should the Public Take Part in

As chairman of the Long-Range Committee in the agreement between Kaiser Steel Corp. and the United Steelworkers, Dr. George W. Taylor is deeply involved in the question of public participation in labor disputes. In this interview with news editor R. D. Raddant, Dr. Taylor discusses many questions that evolve from this vital issue. Dr. Taylor is professor of Industry and chairman of the department at the Wharton School of the Univ. of Pennsylvania. During the 1959 steel negotiations, he served as chairman of President Eisenhower's Board of Inquiry.

■ **Q. What is the general significance of several recent agreements, particularly the one between Kaiser Steel Corp. and the United Steelworkers, under which third parties participate in negotiations?**

A. I accepted the invitation to serve as chairman of the Long-Range Committee under the agreement between Kaiser Steel and the Steelworkers because I believe this is a very important development. It should be made clear that this Committee is a creation of the parties. The public members have been invited to serve, and they have only such responsibilities as the parties have seen fit to assign them.

This arrangement at Kaiser is but one aspect of a total collective bargaining concept. It is not a "gimmick," but rather reflects a mutual desire to make collective bargaining work. We are aware that the responsibility lies with the Steelworkers Union and Kaiser Steel. They are willing to see if they can be helped by public members who, through regular participation, become familiar with the problems that have to be resolved.

The public members have no power of decision; they bear a sort of staff relationship to the parties.

One possible result, as I see it, is to reduce the likelihood of intervention by outsiders, to which the steel industry, for years, has been particularly prone.

One possible way of minimizing that in the future is to depart from "collective bargaining as usual," which has not produced satisfactory results. There has been a lot of talk in the steel industry about the need for new approaches. The Long-Range Committee is such a development.

■ **Q. Do you think present labor bargaining machinery is in step with the times?**

A. We have experienced major changes in our economy and resultant problems in recent years. And big differences exist among us on the best solutions. In our kind of democracy, these differences are resolved by discussion and then by an agreement that accommodates these diverse views.

We have to consider ways and means of adapting our institutions to the changing needs of times. This, it seems to me, is the case in respect to collective bargaining. Maybe there are ways of negotiating which narrow differences better than we have been doing.

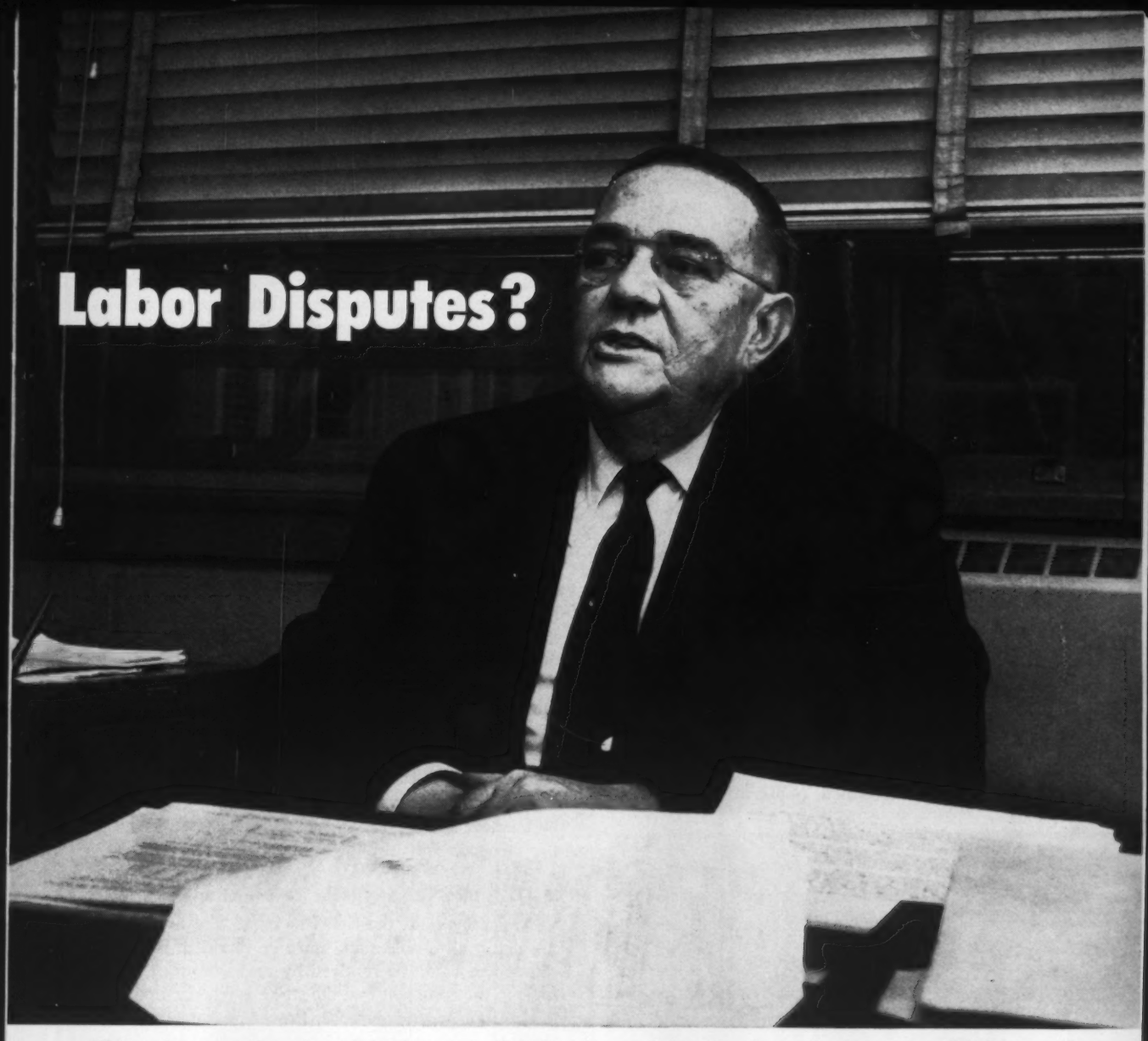
Under collective bargaining, the terms of employment must be agreed to by representatives of those who are affected. This is the essential principle. It can be strengthened, and not weakened, by wise changes in negotiating procedures.

Particularly, this is the case when, as under the Kaiser-USWA agreement, the new procedures are the product of agreement by those affected. This effort of "social inventiveness" was made by thoughtful people at this time when dissatisfaction with "collective bargaining as usual" has evoked many suggestions, mainly for compulsory arbitration, for settlement without regard to acceptability to those affected.

It makes good sense to recognize the need to improve collective bargaining in view of growing criticism of traditional procedures.

■ **Q. What is wrong with present bargaining procedures?**

A. It is my strong opinion that the rights to strike and to lock out must be retained as the last resort in



"It makes good sense to improve collective bargaining in view of growing criticism . . ."

bargaining. This makes sure that the terms will not be imposed from outside.

But the strike is a special purpose tool, and not a general purpose tool. Some differences can be resolved by voluntary arbitration more effectively and less costly. This is no longer a debatable subject. Over the years, unions and companies have come to the view that it is in their best interests to resolve grievances by arbitration, rather than by strikes, which used to be standard procedure.

This bringing in of "outsiders" has not been altogether satisfactory, but it is far better than daily strikes. Some issues over renewal of agreements may also be resolved by arbitration. Possibilities in that direction have really not been purposefully explored. Such changes in ideas come slowly.

There is another serious limitation in the fatalistic use of strikes. Along with recent economic changes, some emerging problems are not susceptible to settlement by crisis collective bargaining. Work rules and adjustments to the impact of so-called automation are examples. First joint discussions on these issues are often held at negotiations undertaken from behind Maginot Line-like positions to be held at all costs.

A strike deadline has a Sword of Damocles effect. The rule of reason is hard to introduce. The criterion for settlement then is what does it take to avoid a strike, rather than how can a particular problem be resolved.

This is crisis collective bargaining. It has resulted in long and costly strikes which, unhappily, don't even

settle the issues. Something is wrong with crisis bargaining. It simply doesn't produce good results.

■ **Q. Why do you think public participation in labor disputes is the answer?**

A. I don't think participation by public representatives in negotiations is a pat answer at all. Nor do I see any merit in the view that participation can be of no value under any circumstances.

There is so much parroting of the line: "Public go home."

As noted, voluntary arbitration of grievances by "outsiders" is now almost universal. In public participation in negotiation by invitation (the outsiders become insiders by invitation), the question is: Do the parties believe they might be assisted in discharging their responsibilities, and thus avoid really outside intervention?

Unions and companies use staff assistance, and even from outside consultants in their own operations. The staff officers recommend, but do not decide. It is conceivable that staff assistance to both parties may be useful in collective bargaining where there are joint responsibilities.

In these terms, some staff assistance is required by law in the form of mediation by outsiders assigned by a governmental agency. It seems that mediation by public participants, as provided for in the report of the Long-Range Committee at Kaiser Steel, involves less imposed, and more informed, public participation.

AT WORK: Dr. Taylor, center, with USWA president David McDonald and Kaiser chairman Edgar Kaiser, right, observe steelmaking at the Kaiser plant.

In the Kaiser arrangement, public members may even make recommendations on the terms of settlement. It is made very clear that either party could reject them. As compared with some suggestions urged for factfinding by a governmental agency, the Kaiser-USWA approach is surely in the direction of firming up collective bargaining as a private undertaking.

■ **Q. Could this lead to government intervention?**

A. Procedures established by the parties themselves which make collective bargaining more effective and less costly are, in my opinion, one of the surest ways to avoid imposed governmental intervention.

When unions and companies in critical situations do not resolve the issues between them by their own devices, the government sooner or later intervenes. This may even interfere with bargaining if one side sees some advantage in intervention.

To an increasing extent, there is a national interest not just in the fact of settlements without strikes, but beyond that, in the terms of settlement and their effect on costs, prices, and production. The public interest relates to the degree of latitude available to those engaged in private decision making. This latitude has been restricted in war time. But, the idea of wage and price controls is not acceptable as a general rule.

■ **Q. Also, is it a step toward compulsory arbitration?**

A. Not at all. These procedures represent a bulwark against compulsory arbitration. Those who favor imposition of terms upon unions and companies assume that the differences cannot be constructively worked out by voluntary agreement. The limit of authority to public representatives in negotiations has to be specified jointly by the parties themselves. They control the process. Even if they agree that the public members might make recommendations, this is a far cry from compulsory arbitration.

If a mutually acceptable substitute for a strike can be created, an effective answer will have been found to the demands for arbitrary compulsory arbitration.

■ **Q. Is the strike as a labor weapon obsolete?**

A. In my view, the rights to strike and to lock out are not at all obsolete and must be retained. But more differences could be resolved by negotiations. There is logic to the comment that the strike is a special purpose device, not general purpose. Procedures of negotiation should be improved with that in mind. Arbitration could be used more in disputes which, something like grievances, do not justify a stoppage.

And, of course, the strike as an element of crisis collective bargaining, is becoming less and less useful in solving complex problems like work rules, automation, seniority, etc.

These need more analysis and study rather than a flexing of economic muscles. There is a growing disposition, too, for employees, employers, and the public to think there ought to be a less costly way of settling differences than in a too-ready use of strikes. While we cannot say the work stoppage is obsolete, its usefulness is diminishing.

■ **Q. Some say when a third party is brought into a labor dispute, it tends to benefit the union side. How do you feel about this?**

A. I suggest that such statements are essentially

subjective. Yet they are understandable. Collective bargaining really didn't get under way in a regular manner until after World War II. By its very nature, collective bargaining changes the way in which decisions about employment terms are made. The management function is affected by varying degrees under the different arrangements that evolve. In most cases, management has quite understandably been concerned with the degree of change and has sought to limit it.

As an agency to help solve collective bargaining problems, third party participation has been related to fashioning a joint determination process which, inherently, has been objectionable to management.

Basically, it is the law of the land, including the right to strike, which has "benefitted the union side." Indeed, union leaders often say that third parties benefit employers by an unduly narrow interpretation of their rights under law.

The real question about the use of third parties involves a comparison of results of strikes as compared to use of third party mediation and suggestions. When either side believes it can achieve its objective through economic power, there is a tendency to avoid "intrusion" by outsiders.

■ **Q. In what issues should public members be involved during negotiations?**

A. The main question here is not about particular issues in which public members may be involved, but in the use of public members by parties to examine critical issues from all points of view.

The public members should not be called upon, however, to help resolve operational problems like settlement of grievances. But they could be asked for ideas about the procedures that might be used.

The use of public members can be appraised only as one part of the union-management relationship designed to make collective bargaining more effective. I would think the parties would want to "involve" public members in those unresolved issues which prevent agreement. But, it is up to the parties to determine the jurisdiction of public members. Public members can only reason. They cannot dictate. One of their functions is likely that of helping to resolve differences over the underlying the issue. Alternate approaches might be easier suggested by uncommitted public members as a matter of trying something on for size.

■ **Q. Is there a need for continuing meetings between management and unions between contract periods?**

A. A labor agreement is ordinarily for a fixed period of time. Its terms cannot be subject to changing daily winds and tides. Yet, unforeseen forces and events do give rise to new problems during the term of the agreement. In the absence of top-level discussion, they are often reflected in the grievance procedure, sometimes being "dragged in by the heels."

There is a tendency for problems of this sort to accumulate until contract negotiating time. Then, under strike deadlines, top negotiators who last met several years ago try to reconcile fixed demands and counter-demands. The emphasis tends to be upon avoidance or termination of a work stoppage rather than a reasoned solution of a particular problem.

Such shortcomings have long been recognized in some industries, including steel, by contract provisions for top-level meetings between management and union during contract periods. These efforts, generally, have not achieved hoped-for results.

The Kaiser-USWA agreements is an experiment to determine whether or not public representation can assist in achieving possible values in continuing meetings which have not been achieved through earlier efforts on a bi-partite basis.

THE VITAL ISSUES

As business moves into the 1960's, management faces a growing number of basic problems. Some reflect the new problems springing up in a decade of change. Others, still unresolved, have been around for some time.

This interview with Dr. George W. Taylor is the first of a new series on these vital issues. Like Dr. Taylor, those interviewed in future articles will play an important part in solving them.

■ **Q. Should top management take part in labor negotiations?**

A. The stakes are often so important top management takes part in negotiations even if indirectly. Indeed, traditional line-staff organizational concepts require that the line officers of a company make the decisions and use staff officers to advise and assist.

One cannot assume that this principle is followed without exception since, especially in labor negotiations, staff officers are sometimes cast in the role of decision makers under authorization of line officers.

The possession of authority is frequently doubted. It is not possible, however, to generalize about whether or not the actual participation of top management in negotiations helps or hinders the carrying out of its line responsibilities.

Different managements have different ideas about this. Involved, it seems to me, is an important matter of business organizational theory and practice as well as tactical bargaining consideration.

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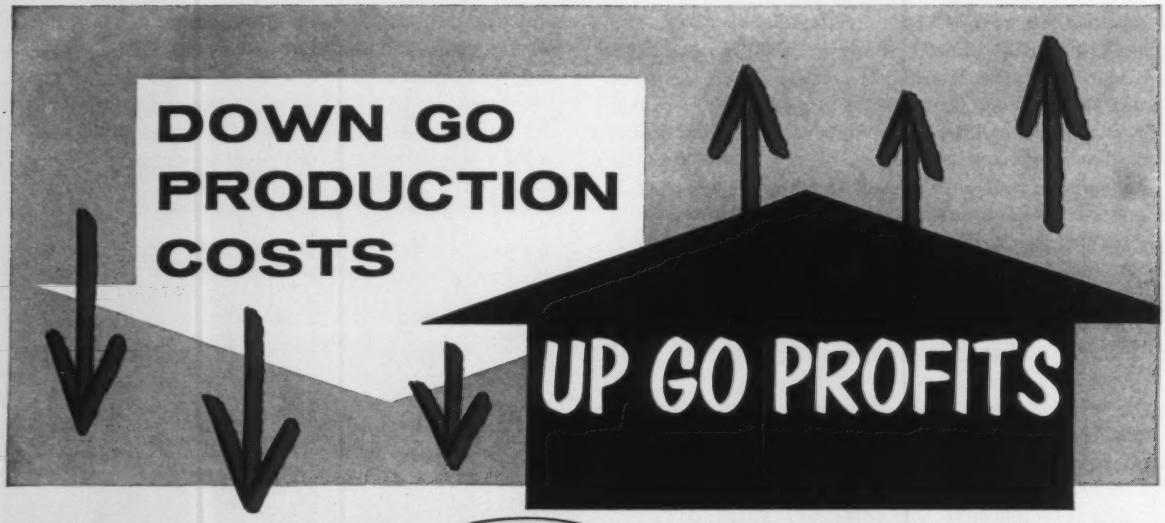
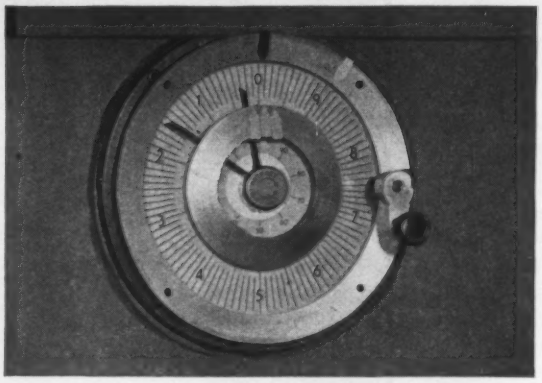
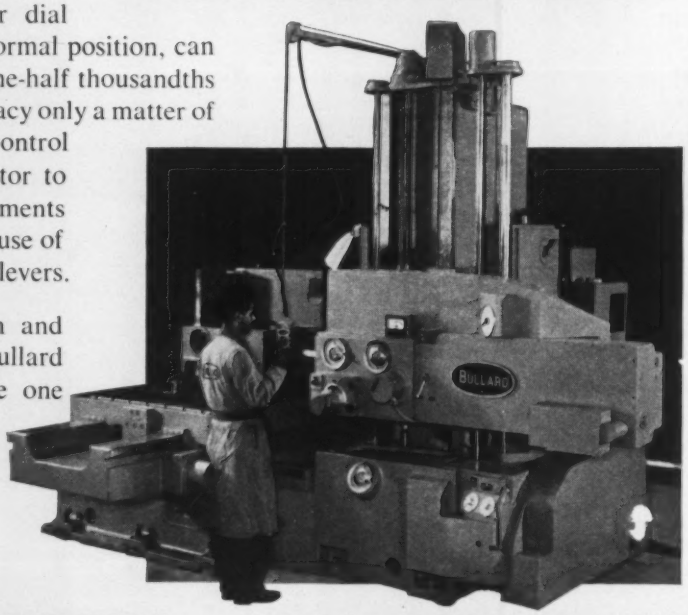


With the NEW BULLARD DYNAMILL H.B.M.



The controls, which have made it possible for Dynamill to reduce non-productive positioning time to a minimum, feature variable traverse rates recorded on large, clock-type dials, and controlled by Bullard's remote control pendant.

Head, table, saddle, and spindle each have a separate three-pointer dial which the operator, from his normal position, can easily read to an accuracy of one-half thousandths of an inch with further accuracy only a matter of simple interpolation. The remote control pendant allows the operator to traverse and position all elements under power without the use of handwheels, cranks or levers.



These and many other design and construction features of the Bullard Dynamill H.B.M. make it the one machine you

must investigate before buying any horizontal boring machine.

THE BULLARD COMPANY BRIDGEPORT 9, CONN.

Ford Says Hold Labor Cost Line

Henry Ford's statement on "hold the line" on labor and other costs is first pre-negotiation trial balloon.

Labor talks get under way July 1. Deadline is Aug. 31.
By A. E. Fleming

■ Henry Ford II last week rang the bell for round one in this year's auto contract negotiations in an annual report to stockholders.

Laying it on the line, Ford Motor Co.'s president and board chairman, warned, "In the face of intensive competition in this country for the consumer's dollar and fast-growing competition from abroad for world automobile markets outside of the U. S., your management believes it essential to hold the line on all costs, avoiding particularly any labor cost increases that could force us to raise prices."

Hurts Everyone—Then he said, "Failure to contain costs and prices could seriously harm the interests of employees as well as of stockholders and the general public. Only if we more carefully discipline ourselves in all cost areas can we earn a bigger share of markets abroad as well as those at home and thus bring real gains to all Americans."

Mr. Ford's words were the first tangible evidence of his company's and, in essence, the Big Three's attitudes on the coming labor talks which get under way around July 1, two months before contracts expire. There is little doubt the message was, "We won't be a pushover in bargaining this summer."

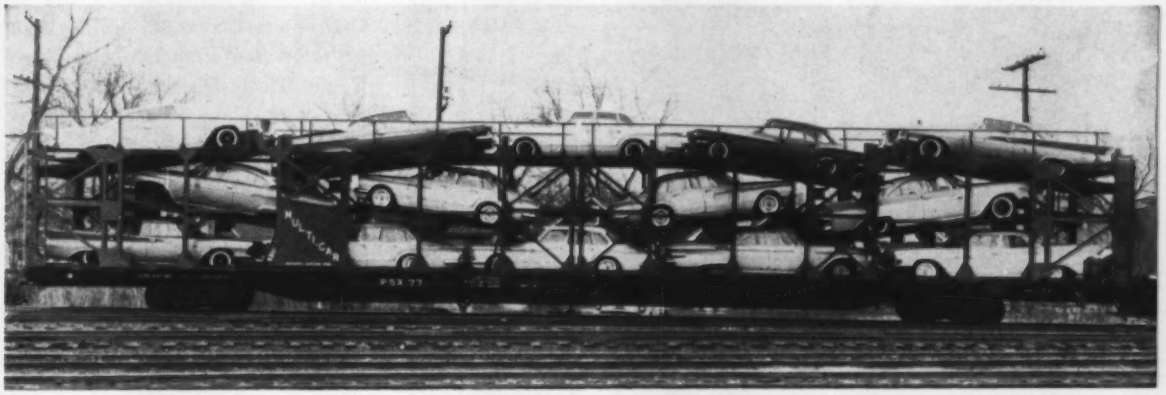
Union Reacts—There was no immediate reaction to Mr. Ford's statement by the UAW's national officers. President Walter Reuther was in Washington busily putting his shoulder behind a "Get America back to work program."

But in one of Mr. Ford's own plants, the tremendous Rouge works in Michigan, a familiar voice was raised. Carl Stellato, president of the 27,000-member Local 600, biggest in the UAW and a powerful factor in Ford bargaining councils of the union, retorted, "We're ready to hold the wage line when Ford is ready and willing to hold the line on profits." Mr. Stellato obviously had looked over the company's financial statement which showed net income of $428 million in 1960 and $451 in 1959 against 1955's record level of $454 million.

Then, in a warning of his own, Mr. Stellato revealed what his local wants in the coming contract. If met, the demands reportedly would increase the $3.59 hourly labor cost at Ford to over $5.

Among the several points Mr. Stellato said were the very least he hopes to gain this summer: Reduced retirement age, shorter work week, SUB changes payment by the company of full medical benefits.

New Railroad Car Carries Big Load of Autos



BIG LOAD: A new automobile railroad car has been developed to meet an expected increase in demand for rail transportation of new model cars in 1962. Developed by Multi-Car Corp., Detroit, it provides up to 75 pct greater shipping capacity. The new carrier will enable automakers to ship at tri-level capacity to the East and many points in the South and Northwest that they couldn't before because of clearance restrictions. Whitehead and Kales will begin volume production in March. The carrier is 87 ft 4 in. long, 16 ft 8 in. high, and 9 ft wide. It will carry 12 standard size cars or a mixed load of 14 compact and standard cars.

Bay Area Plans Rapid Transit

But Financing May Hamper the $1.3 Billion Project

Plans have been announced for a $1.3 billion rapid transit system in the San Francisco Bay area.

Already, some companies are studying the market possibilities. But financing may slow things down.
By R. R. Kay

■ A $1.3 billion rapid transit system for the San Francisco Bay area will open new avenues for metalworkers. The job: Fifteen miles of subways, 12 miles of tunnels, 65 miles of elevated transportation; 35 miles of surface construction.

Also a 3.6 mile Trans-Bay Tube; and trackage and other work to modify the 1.3-mile-long span of Golden Gate Bridge.

Steel mills, electronic companies, auto and planemakers throughout the country are eyeing the job. Some already have made design proposals and bids.

Financing Hurdle—The project is beyond the early dream stage. But even its most ardent backers concede it may be several years before the first hurdle—financing—is cleared. Some say it may take legislative action to finance the five-county job.

Here's a breakdown that involves metalworking: Tracks and structures, $370 million; stations, $124 million; yards and shops, $17.5 million; electrification, $76.5 million; train controls, $24.4 million; and utility relocations, $44 million.

The Trans-Bay Tube alone adds another $127 million.

Interested Companies—These are some of the companies going after the business: Budd Co. and St. Louis Car Co., lightweight rail cars; General Electric Co. and Westinghouse Corp., propulsion; Westinghouse Air Brake Corp., brakes; International Business Machine Corp., fare collection and train controls; Pacific Telephone Corp., communications; Union Switch & Signal Co., and General Railway Signal Corp., train controls.

Lockheed Aircraft Co. and Northrop Corp., monorail and lightweight cars; International Telephone & Telegraph Corp., communications and controls; and Convair Div. of General Dynamics Corp., cars and rubber tires.

If you're interested, get in touch with the San Francisco Bay Area Rapid Transit District. Engineering consultants are Parson-Brinckerhoff-Tudor-Bechtel.

The Standards—Planners for the new rapid transit system aim at these standards:

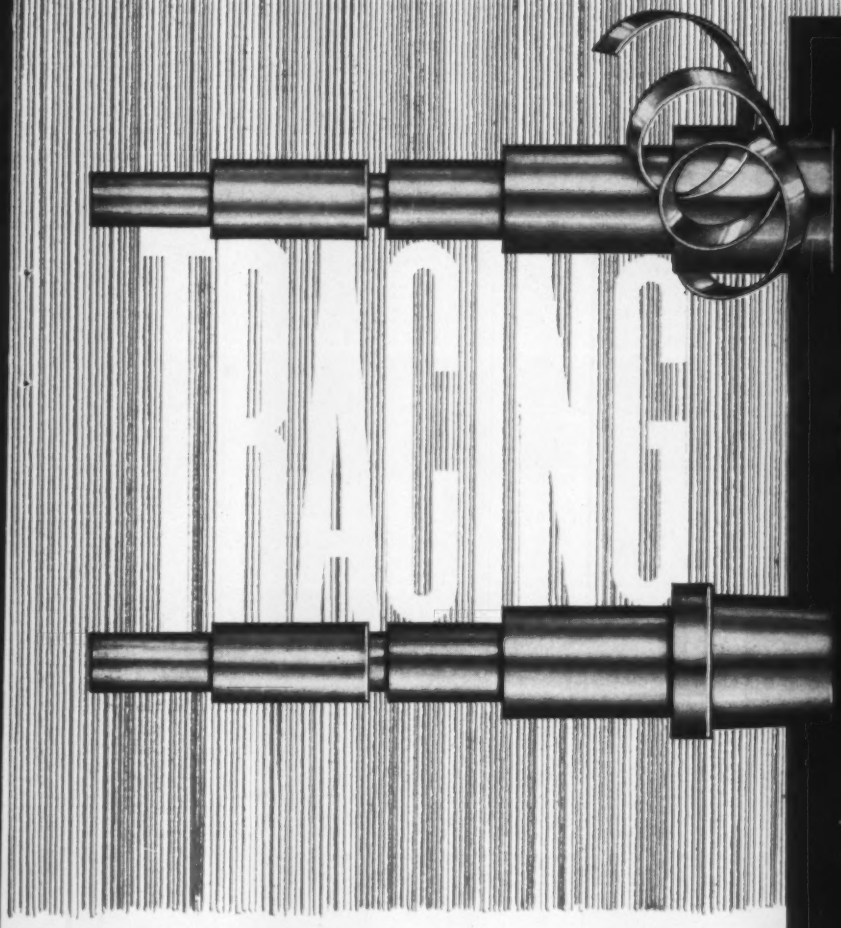
(1) It must be able to move at least 30,000 seated passengers per hour over one track. And operate at headways of 90 seconds.

(2) It must average 45 mph, including time for station stops.

(3) It must assure a low external noise level, be safe, and need minimum capital, maintenance, and operating costs.

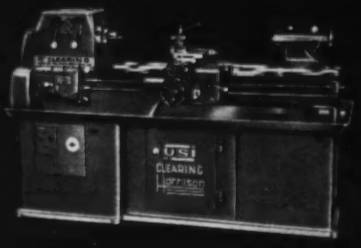
B-70 Brazing Fixtures Take Form

FOR SKIN PANELS: The first of the B-70 brazing fixtures are under construction at Lockheed's Marietta, Ga., plant. At least 30 of these portable furnaces will make skin panels for the bomber.



Clearing-Harrison Copying Lathes Comparably Priced to Standard Lathes

12" Copying lathe $4,295.00
12" Standard lathe $2,495.00



13" Copying lathe $5,150.00
13" Standard lathe $3,300.00

16" Copying lathe $7,150.00
16" Standard lathe $4,895.00

HERE IS TRACING EQUIPMENT THAT PAYS FOR ITSELF IN THE FIRST FEW MONTHS

If you have any need at all for repetitive turning, the Clearing-Harrison copying lathe is your economical solution. Use this machine as a standard lathe. Turn out a template or first part. Then apply the copying equipment. That's all there is to it.

And there's a lifetime of **profitable** service in these high quality machines. They feature: All Gear Heads • Anti-friction Bearings on the Spindle • Induction Hardened Bed Ways • Gap-type Beds.

Check the prices at right of Clearing-Harrison copying lathes and standard lathes. Then write for details. No obligation, of course.

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TV Camera Can Cut Tool Costs

Built-In Screen on Machine Raises Output, Accuracy

A boring machine with a built-in television screen is the newest way to cut tool costs.

Increased accuracy and output are among the gains reported by a Detroit tool builder.
By R. H. Eshelman

TV MACHINING: Closed circuit on large Gray horizontal milling and boring machine helps operator do precision work on intricate large press dies at Buell Die & Machine Co., Detroit.

▪ Tool builders might turn to television for better machining.

A Detroit Tooling Assn. member has installed an ingenious closed circuit TV camera and screen on a large floor-type boring machine. It gives the operator an extra pair of eyes. This increases accuracy and output. And it eliminates the need for a second operator.

Before TV, there were two choices in machining large dies: An extra operator had to position the cutting tool with precision and report position of the carriage; or the operator had to climb down from his controls to read the vernier scale on the machine's bed.

Both methods were costly.

Scans the Scale—The Buell Die & Machine Co. placed a small TV camera on the vernier scale. The operator reads the location of the carriage on the longitudinal ways directly from the TV screen facing him.

The camera continuously scans the scale, and the image is projected to the screen. Wherever the machine carriage moves, the TV receiver and operator go with it.

Normal Location—This huge machine tool is a horizontal milling and boring unit. The cutting tool carriage traverses 12 ft vertically, 18 ft in transverse direction and five ft in and out. From his normal location the operator can control and read the carriage vertical and in and out movements.

With television he can also instantly read the transverse position to far greater accuracy. The vernier scale is accurate to 50 thousandths; the TV screen image magnifies it so that a 50 thousandths shows up as a quarter inch in size.

As a result, the operator can interpolate increments as small as 0.0001-in. or less.

Greater Accuracy—Thus, in addition to increased productivity and improved convenience, TV allows greater accuracy.

The camera is mounted under a set-plate at the bottom of the moveable machine column. Thus it is protected from cutting fluid, chips and dirt. It is focussed always on the vernier scale mounted on the machine bed.

The 14-in. screen is much like a conventional receiving set. It's fastened permanently to the moveable carriage that also contains the operator walkway and controls. It is slightly above but directly in front of the operator's station.

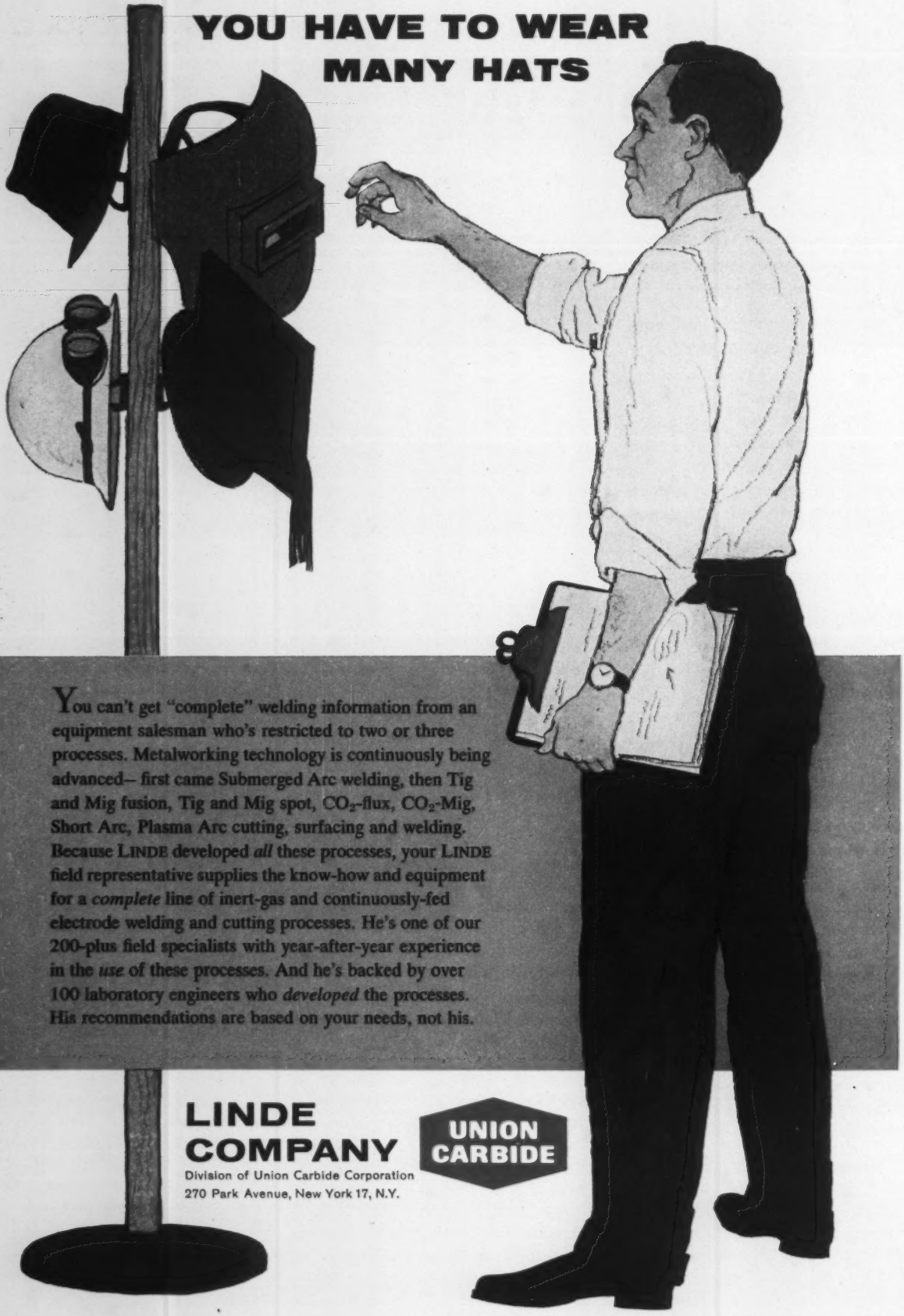
Press Earnings Up

With earnings and profits generally on the downside, one company in the press field has struck an optimistic note.

E. W. Bliss Co. says it expects to report net earnings for 1960 of approximately $1.9 million (or $1.40 per common share), on sales of about $86 million, according to Robert Potter, board chairman.

This compares with 1959 earnings of $786,843, equivalent to 48¢ per share, on sales of almost $75 million.

YOU HAVE TO WEAR MANY HATS



You can't get "complete" welding information from an equipment salesman who's restricted to two or three processes. Metalworking technology is continuously being advanced— first came Submerged Arc welding, then Tig and Mig fusion, Tig and Mig spot, CO_2-flux, CO_2-Mig, Short Arc, Plasma Arc cutting, surfacing and welding. Because LINDE developed *all* these processes, your LINDE field representative supplies the know-how and equipment for a *complete* line of inert-gas and continuously-fed electrode welding and cutting processes. He's one of our 200-plus field specialists with year-after-year experience in the *use* of these processes. And he's backed by over 100 laboratory engineers who *developed* the processes. His recommendations are based on your needs, not his.

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Division of Union Carbide Corporation
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UNION CARBIDE

E. M. Furness, elected vice president, operations, Reserve Mining Co., Silver Bay, Minn.

Bliss & Laughlin, Inc. — **C. S. Hogberg,** appointed assistant vice president, Buffalo plant.

Revere Copper & Brass, Inc.— **J. C. Emison, Jr.,** elected treasurer; **W. R. Brent,** named assistant treasurer and manager, foreign operations.

Electro Dynamics Div., General Dynamics Corp.—**Harris Shapiro,** appointed vice president, engineering.

Dayco Corp.—**S. K. Lamden,** appointed vice president, plastic hose sales.

Can-Fer Mines Ltd.—**L. H. Timmins,** elected director and appointed vice president, Toronto.

Cincinnati Galvanizing Co.— **K. C. Kirkorian,** elected president.

Size Control Co.—**P. J. Sommer,** appointed vice president and general manager; **T. J. Owen,** appointed vice president, manufacturing; **F. J. Vlasaty,** appointed sales manager.

Screw and Bolt Corp. — **Louis Berkman,** elected president. He succeeds **D. D. Greenshields,** who has retired; **A. H. Berkman** and **A. G. Keller,** elected directors.

Potomac Sand and Gravel Co.— **C. R. Lorenz, Jr.,** appointed assistant to the president.

Risdon Mfg. Co.—**L. A. Dibble,** elected chairman of the board and chief executive officer. Succeeding him as president is **L. A. Dibble, Jr.; H. W. Turnblom,** elected treasurer; **R. G. Goodeve,** named secretary; **C. E. Retallick** becomes assistant treasurer.

Pullman-Standard Co. — **J. W. Bergen,** appointed assistant vice president, sales.

Electric Autolite Co. — **J. J. Bohmrich,** named head of foreign activities; **S. A. Keller** succeeds him as group vice president in charge of electrical products divisions.

G. A. May, appointed executive vice president and general manager, Allen Mfg. Co., Chicago.

Borg-Warner Corp.—**Ernest Rackel,** appointed vice president, manufacturing, Ingersoll Kalamazoo Div.

Youngstown Steel Car Corp.— **J. L. Kelly** named vice president and general manager. He succeeds **A. E. Wilkoff,** who resigned.

Kawneer Co.—**S. A. Furbacher,** elected executive vice president.

Inland Steel Products Co.—**D. R. Axtell,** appointed assistant to the vice president.

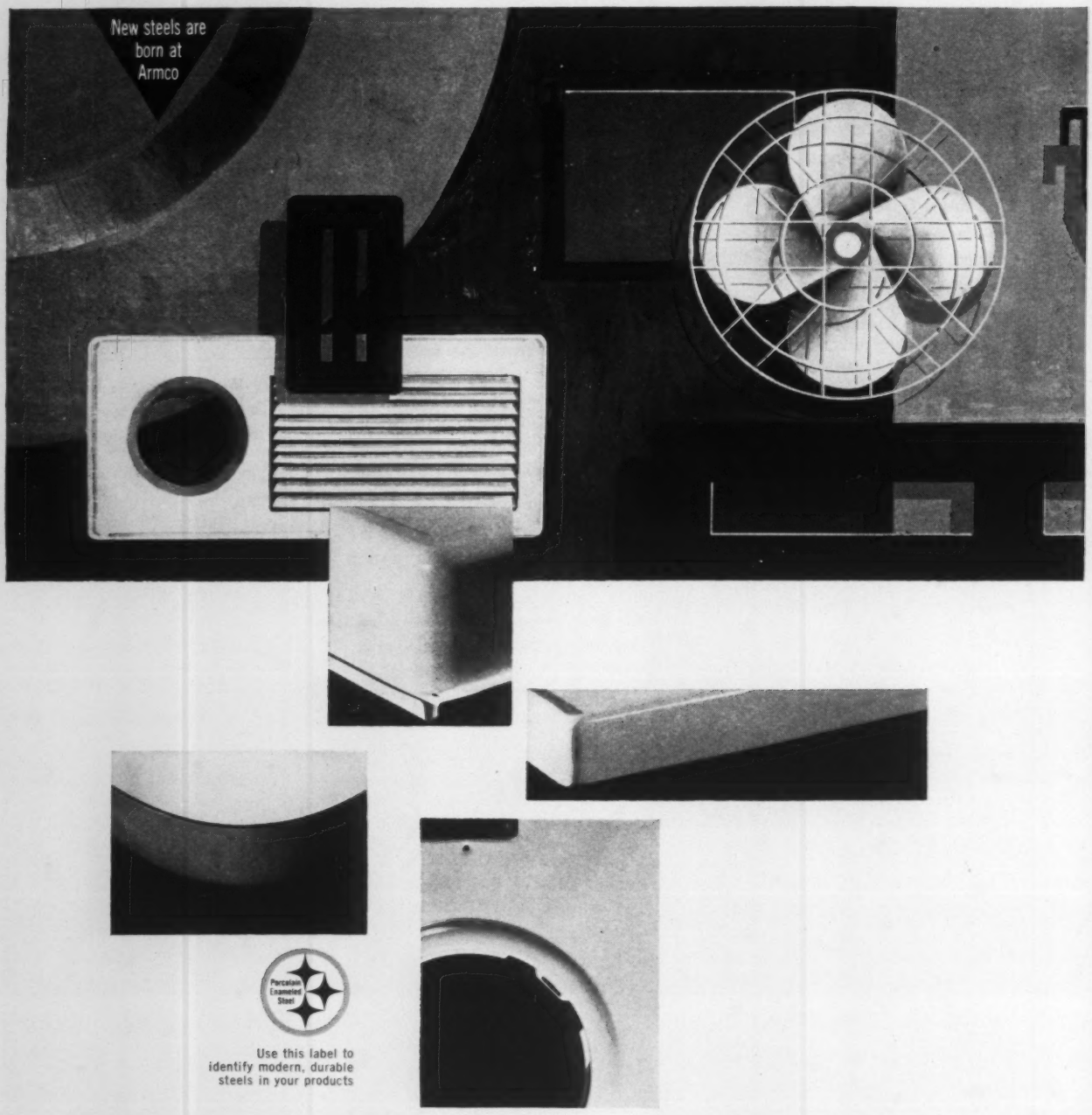
(Continued on P. 104)

E. G. Sheasby, appointed vice president, Detroit Automotive Div., Bliss & Laughlin, Inc., Harvey, Ill.

H. M. Clarke, appointed vice president, Harvey Div., Bliss & Laughlin, Inc.

F. C. Hyde, named vice president, Revere Copper and Brass Inc., New York.

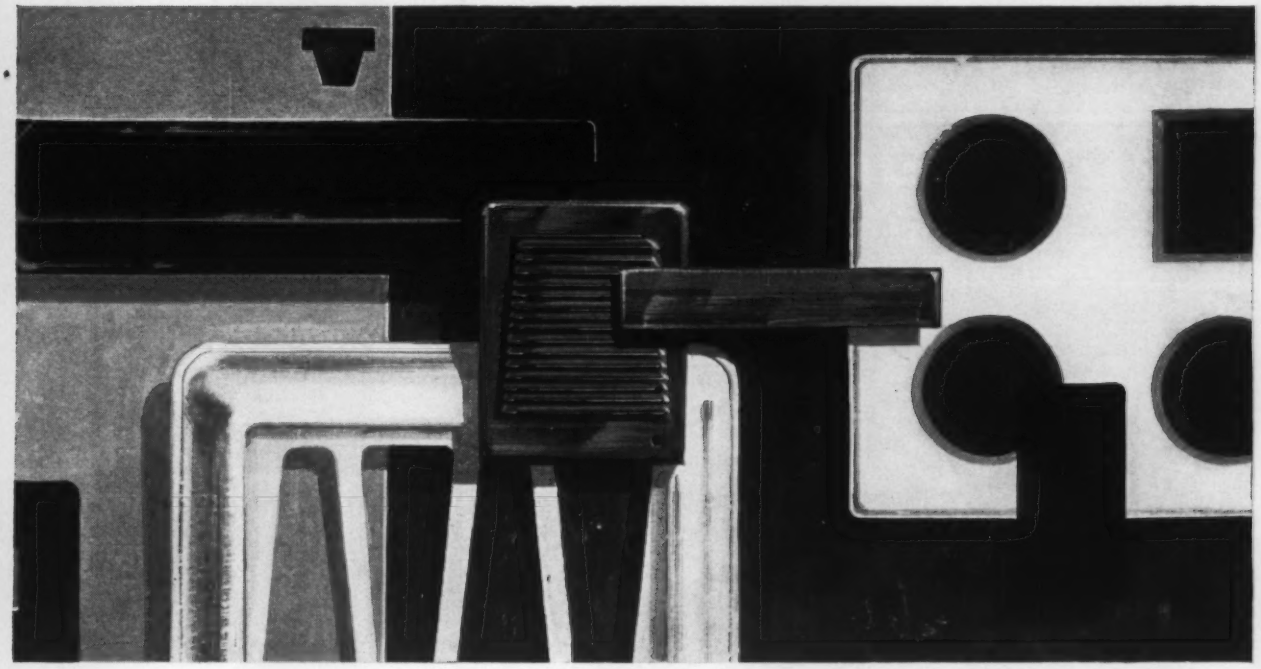
Now—durable, low-cost porcelain



Use this label to identify modern, durable steels in your products

enamel on Armco UNIVIT

Cost of porcelain enamel
on UNIVIT compares favorably with baked enamel or vinyl finishes



"Direct-on" porcelain enameling with new Armco UNIVIT® assures real production economy. As a result, applications where baked enamel or vinyl finishes are now used come within the cost range of durable, service proved porcelain enamel.

UNIVIT permits one-coat, one-fire porcelain enameling without danger of boiling or fishscaling. The smooth, attractive finish fights abrasion and corrosion, provides exceptional resistance to mechanical damage and thermal shock.

For superior two-coat enameling, Armco produces Armco Enameling Iron, long known as "The World's Standard" for fine porcelain enamel finishes. Behind both grades is Armco's unmatched production record and service experience developed through more than 50 years as the world's foremost supplier of base metal for high-quality porcelain enameling. Armco Division, Armco Steel Corporation, 1391 Curtis Street, Middletown, Ohio.

ARMCO **Armco Division**

(Continued from P. 101)

Racine Hydraulics & Machinery, Inc.—**G. A. Verhaeghe,** named vice president, hydraulic products.

Gould-National Batteries, Inc.—**F. H. Daehn,** elected treasurer.

General Chemical Div., Allied Chemical Corp.—**G. C. Rayner,** appointed assistant to the president.

Package Machinery Co. — **L. L. Campbell,** elected vice president, engineering.

Weinman Pump & Supply Co.—**C. D. Chalfant,** elected president. He succeeds **C. E. Chalfant,** who has been elected chairman of the board.

Wyman-Gordon Co.—**A. L. Rustay,** elected vice president.

Mirro Aluminum Co. — **Thomas Swingle,** appointed sales representative aluminum builder products.

Sheffield Div., Armco Steel Corp. —**R. R. Stoutimore,** named works engineer.

E. A. Koenig, appointed vice president, sales, Yoder Co., Cleveland.

M. L. Ross, elected vice president, U. N. Alloy Steel Corp., Boston.

Kaiser-Nelson Co.—**D. M. Gentile,** appointed general superintendent, operations, Cleveland and Mansfield districts.

Warehouse Storage Systems Co., Div., Hatfield Industries, Inc. — **C. G. Olsen,** appointed midwest division manager.

Anaconda American Brass Co.—**W. J. Hartford,** appointed district sales manager, Rochester, N. Y.; **L. A. Duley,** appointed district sales manager, Washington, D. C.

Bessemer & Lake Erie Railroad Co.—**G. A. Squibb,** appointed general traffic manager.

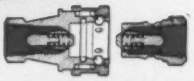
Stanley-Humason, Inc. — **G. W. Lennan,** appointed sales representative.

Hydraulic and pneumatic lines are quickly and easily connected with Hansen Two-Way Shut-Off Couplings. No tools required.

When coupling is disconnected, valves contact valve seats in both Socket and Plug to provide instant and positive seal of fluid in both ends of line. Coupling does not depend upon line pressure to seal either end of line.

Hansen Series HK Couplings are furnished in steel or brass, with female pipe thread connections from ⅛" to 1½" respectively. Sizes up to 1" are also now available in stainless steel.

Representatives in Principal Cities ... See Yellow Pages



Instantly shuts off both sides of line... prevents loss of liquid, gas or pressure.

Quick-Connective Fluid Line Couplings for:

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REFRIGERANTS • GASOLINE
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Write for the Hansen Catalog
Here is an always ready reference when you want information on couplings in a hurry. Lists complete range of sizes and types of Hansen One-Way Shut-Off, Two-Way Shut-Off, and Straight-Through Couplings.

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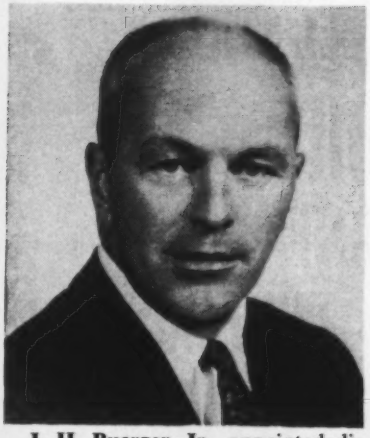


J. H. Buerger, Jr., appointed director sales, Crucible Steel Co., Pittsburgh.

H. C. Wilson, named vice president, Revere Copper and Brass Inc., New York.

Thread Well Tap & Die Co.—**T. W. Clark,** named president and general manager.

Yale Materials Handling Div., Yale & Towne Mfg. Co.—**W. R. Saunders,** appointed north midwest regional manager.

Universal-Cyclops Steel Corp.—**R. M. Keenan,** appointed manager, Shear Knife Sales.

Alan Wood Steel Co.—**G. J. Van Fossen,** appointed superintendent.

Baldwin-Lima-Hamilton Corp.—**H. T. Lowell, Jr.,** appointed general sales manager.

Chas. Taylor Sons Co. — **F. W. Trost,** named district sales manager, Philadelphia.

Weston Instruments Div., Daystrom, Inc. — **J. W. Harte, Jr.,** named service division manager.

American Nickleloid Co.—**R. E. Nenno,** appointed sales representative, Upper New York.

Acme-Newport Steel Co.—**S. D. Oker,** appointed district sales manager, Central Ohio.

Air Reduction Sales Co.—**F. N. Zabriskie,** named assistant sales manager, midwestern region.

Ready-Power Co.—**R. W. Pelto** and **N. K. Hall,** appointed vice presidents.

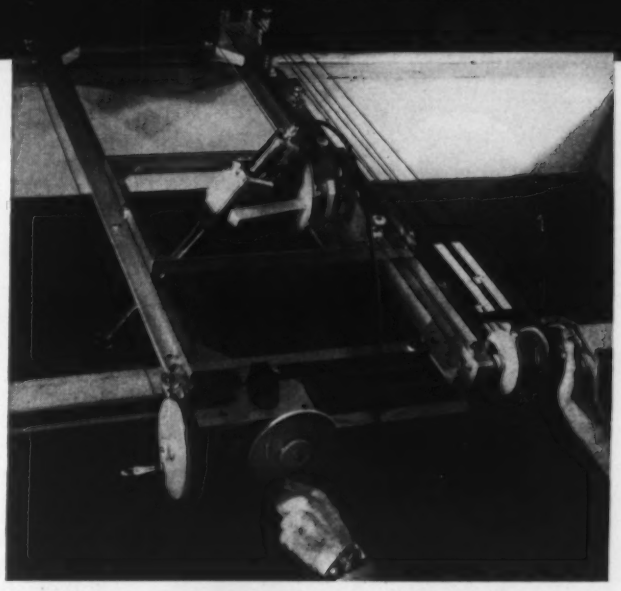
Pratt & Whitney Co., Inc.—**M. S. Silvey,** named contract sales manager.

Electronic Data Processing Div., Minneapolis - Honeywell Regulator Co.—**J. M. Scandalios,** appointed manager, Detroit branch.

Inland Steel Co.—**G. F. Bowler,** appointed director of budgets.

SCANNING BRIDGE

The Robot hands for ultrasonic flaw detection!



This "tailor-made" scanning bridge is used with the SONORAY® flaw detector. It holds the transducer in the required position and also permits its adjustment. The transducer may be raised or lowered, tilted in 2 planes or moved to any position in the tank.

Salient features:

- Ease of Operation (all controls are on one side and close to the operator)
- High-Accuracy Positioning • Light in Weight, but sturdy • Economy Priced

The scanning bridge is merely one of many outstanding examples of BRANSON ingenuity. This bridge was designed with the customer in mind! It was well-engineered at the lowest possible cost. The next time you have a problem, call BRANSON and see how fast BRANSON will find the best solution in the shortest possible time.

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Stainless Steel

FIRST to guarantee—unconditionally—that its product would successfully survive the Automotive Industry's severe tests for brightness and corrosion-resistance . . . tests the product did pass, a performance that has caused thirteen competitors to try to copy Wallingford's unique method, a method that remains unmatched; and a performance that convinced one major automotive company to specify Wallingford Type 201 Bright Annealed exclusively!

FOREMOST in total Bright Annealed tonnage produced, in installed capacity for producing it, and in years of research, development, and application experience . . . eleven of them rewardingly spent in the refinement of this super functional and decorative material.

FINEST . . . our claim that Wallingford Bright Annealed is the finest is repeatedly reinforced by our customers' outspoken praise of it. Ask them. References willingly supplied on request.

And ask us how Wallingford Bright Annealed can enhance the beauty of your product, endow it with high corrosion resistance, and greatly reduce your finishing costs. Describe your application and we'll provide specific recommendations.

Progress in Metals

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TONNAGE *on a Laboratory Basis*

Since 1922

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Air Force Takes Command

The Air Force now holds the key to contracts for development of space vehicles. Defense Secretary McNamara last week assigned the Air Force almost total responsibility for military space vehicles. More than 91 pct of the $850 million to be spent for military space R & D will be handled by the Air Force.

Study Radiation Effects

How will space vehicles and satellites react to space radiation? Recently, some 40,000 curies of radioactive cobalt 60 were placed in wells beneath two "hot cells" at Republic Aviation. Lab engineers will use the material to study radiation effects on materials, fluid power systems and electronic components.

Powder for Nuclear Parts

Look for an announcement soon of success in making nuclear parts by powder-metallurgy shortcuts. The process, which includes forming parts in a vacuum, is reported to greatly cut costs of many zirconium and columbium alloy parts. Purity is maintained. The new technology may afford many other interesting metalworking applications for making unique designs.

Uranium: Aid to Steel?

Uranium is being tested as a means for preventing corrosion in high strength missile alloys. Tests so far indicate that uranium makes alloys passive to certain corrosion conditions. Though uranium is still costly, it gives improved corrosion resistance over other methods.

Blocks Instead of Tubes

Developed for military testing is a radio receiver that uses no tubes, no transistors, and no electronic circuits. The main working parts of the Westinghouse design are six silicon electronic blocks, each about the size of a dime and one-fourth as thick. The receiver can tune in all standard stations. Ordinarily, such a set would use about 50 individual electronic components, wired by 150 soldered connections.

"Dish" Protects Metal

A 400-lb, 60-in. diam reinforced plastic "dish", said to be the heaviest and largest compression-molded part to date, is being made for the

MOLDED PLASTIC: Hinders damage.

Minuteman. Molded to close tolerances in one piece and in a single press shot, the "dish" is designed to protect the steel structural casing from damage by burning propellant. It will be subjected to temperatures greater than 5000°F at high pressures.

Project Materials Needs

Materials experts and top aerospace designers are putting their heads together to come up with materials and fabrication needs of the next 10-15 years. They feel studies should begin on techniques to work metals such as molybdenum, tungsten, and beryllium in larger sizes for the next generation of re-entry vehicles now on the boards. Solutions which work for missiles will not do for U. S. manned vehicles.

To Forecast Weather

NASA, the Pentagon, and the U. S. Weather Bureau are teaming up to develop a national system of space weather stations. NASA plans to launch six weather satellites in the next two to three years to improve forecasting and storm-warning services. Two tiros weather-eyes, like those launched in 1960, will be sent up this year.

TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

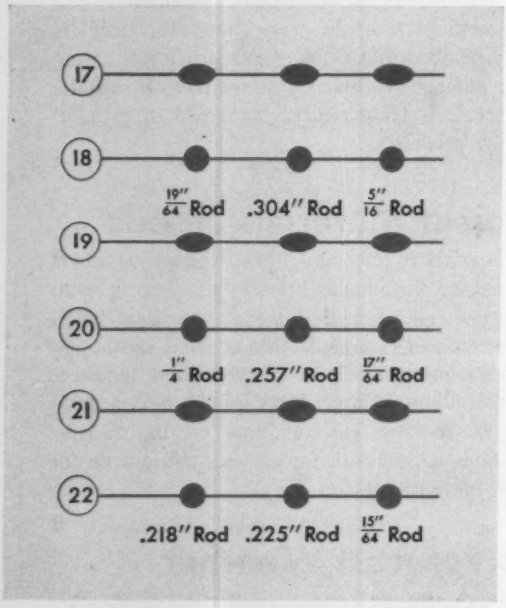
EASY WAY TO

Improve rod mill roll life...and product quality

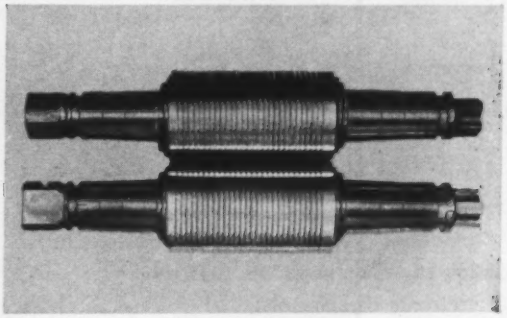
Sometimes, the tried-and-true way of doing something gets so thoroughly established that people tend to forget that there may be a better way. A good case in point is the rolls that are used in rod mill finishing stands. For various reasons, most of these mills use rolls of 70 Shore hardness or below. The passes are many and fine, and at this hardness they are relatively easy to cut.

However, several of our rod mill roll customers have been trying rolls a good 4 to 6 Shore points harder than the widely accepted top limit.

Results, in our opinion . . . and our customers'. . . have more than justified the somewhat greater degree of difficulty in turning and redressing the rolls. In fact, total turning and redressing time has been cut, since the passes wear so much more slowly. In at least one instance, the use of these harder rolls has eliminated *all* early roll changes in the finishing stands.



Flow sheet for fine rod sizes. It is the last five stands where the performance of the harder rolls makes the greater difference.



Set of #3 Nichillite rod mill finishing rolls, 74 Shore. These particular rolls have given outstanding results in the finishers of a modern high-speed Midwestern mill.

Stoning time cut sharply. In this particular mill, the harder rolls have cut stoning time in half. Even more important, however, is the increased yield of top-quality material. As a result, there has been a general upgrading of the product at all levels, with a consequent improvement in profits directly traceable to the harder rolls.

Two good roll analyses. If you operate a rod mill, we suggest that the next time you order rolls for the finishing stands, you specify some sets of Mack-Hemp *Nichillite* chilled nickel alloy iron rolls in the 74-to-76 Shore hardness range. These should give you performance similar to that described above, together with the best possible surface finish on the rolled rod.

Eventually you will want to raise the hardness of the intermediate stand rolls to complement the better service of the finishing stands. This will achieve a total upgrading of roll service throughout the mill and result in an even better finished product.

On the other hand, if your mill is one of the new high-speed types, we recommend our *Nironite C* nickel-chromium-iron analysis, in the same hardness range. *Nironite C* rolls provide an extra margin of strength to take the heavy torsional stresses developed by faster mills.

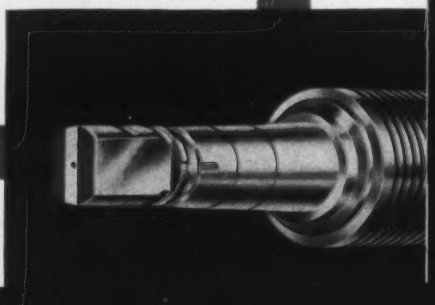
No matter what your problem of roll use or selection, you'll find that Mack-Hemp can give you helpful advice on the best way to solve it. Simply write or telephone us. Address Mackintosh-Hemphill Division, E. W. Bliss Company, 901 Bingham Street, Pittsburgh 3, Pa.

MACKINTOSH-HEMPHILL

You get more tonnage from "the rolls with the Striped Red Wabblers"

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery



Are Welding Codes Outdated?

Greater Leniency Could Help Industry in General

By **R. Weck**—Director of Research, British Welding Research Assn., London, England

It takes years of effort to establish a new welding code. It also takes evidence.

Enough evidence has mounted during the past decades to justify a realistic appraisal of the entire system.

▪ It's readily agreed that welding processes have come of age. Unfortunately, the codes governing welding have not. This odd situation is evident in the welding of bridges, buildings, pressure vessels and pipelines.

The facts are recorded in history. In the British Standard Specification for steel girder bridges, for example, there was a clause in force until 1954. It survived many revisions. The clause required that bridge members in which the load changed from compression to tension during the passage of a vehicle be designed to withstand a certain calculated stress.

This clause had been introduced when all bridges were riveted (not welded). In the meantime, engineers had built up a whole new area of knowledge about structural fatigue.

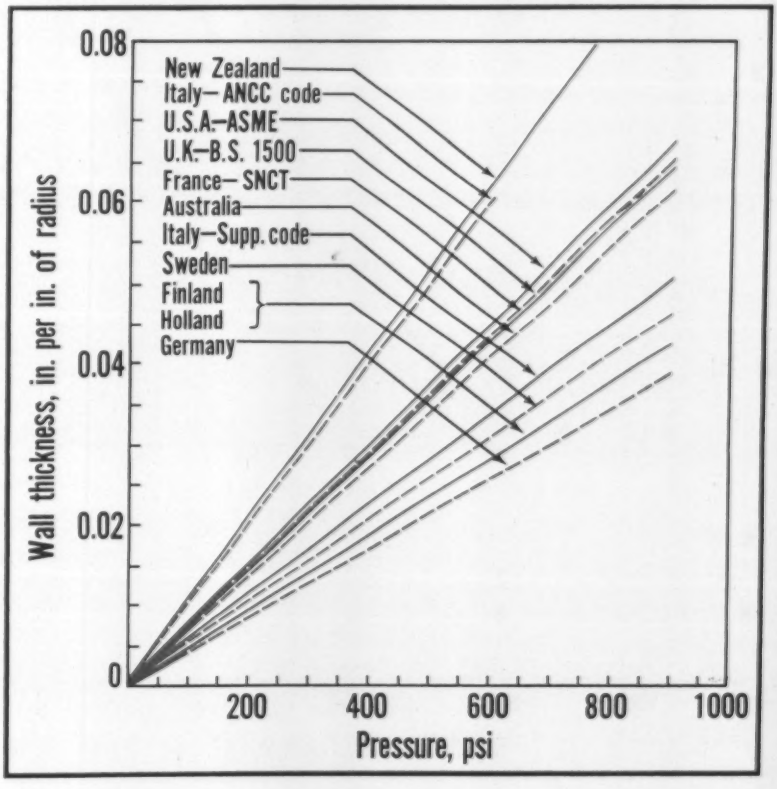
Plastic Design — Welded frames can now be built in the British Isles with fully rigid connections using the plastic theory of design. Times have changed. Formerly, compression members of riveted buildings were calculated by a simple column formula. Welded structures had to be designed as compression members with large bending moments.

As a result, welded buildings worked out much heavier than the riveted ones for the same loads. Years of tests on full-scale structures finally convinced codemakers that the actual load carrying capacity of welded structures was much higher than that of riveted structures of equal weight.

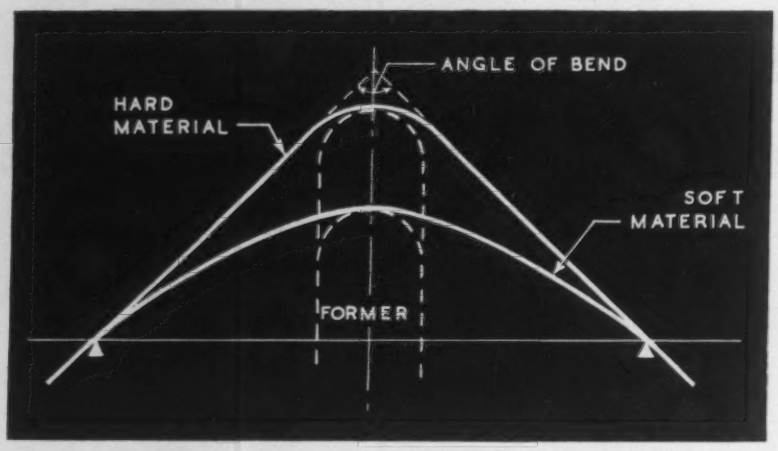
Code requirements aren't always logical. In fact, they sometimes defeat their own objective. In both British and German pressure vessel codes, stress relief for certain types of vessels is optional. If omitted, then a lower joint efficiency for butt welds may be used. When this is the case, shell thickness must be increased.

Since the transition temperatures for plate increases with thickness, the risk of brittle fracture also increases. This is not only true by the omission of stress relief but by virtue of the greater thickness. In calling for a lower joint efficiency the vessel

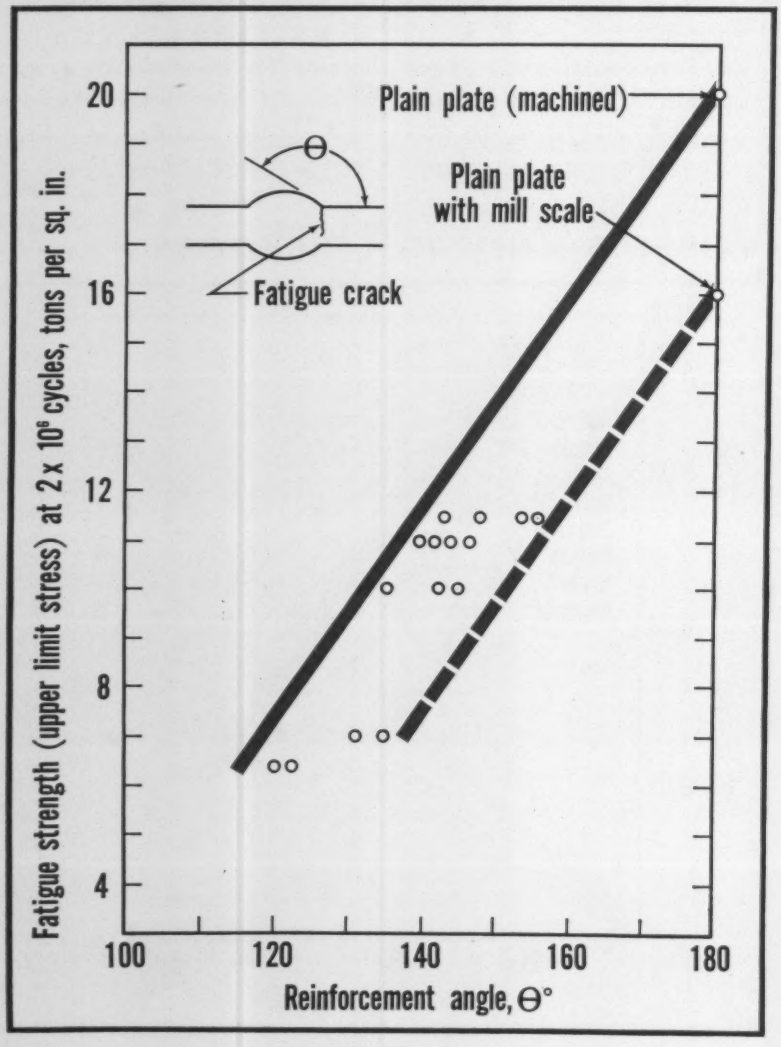
Vessels Vary in Thickness



Bend Tests Vs. Tensile Tests



Why Fatigue Strength Drops



becomes less, rather than more, safe.

You can't blame some companies for opposing code revisions. Suppose a company invests a large sum of money in a large stress-relieving furnace for pressure vesels. This company will not be too keen about any proposal to relax stress-relieving requirements.

Other interests grow up around specific code requirements for which a change may spell financial loss or loss of influence. When these interests combine, they can form a powerful brake on code revision. In time, it can also act as a powerful brake on progress.

World Apart—Different nations have widely divergent requirements. For room temperature duty, an American pressure vessel is twice as thick as an equivalent vessel made according to German standards. Yet at 900°F, the German vessel must be twice as thick as one made in the United States.

There is much scope also for a clean-up in the requirements for mechanical tests. A number of tests are often required which give the same information. Worse still, there's a tendency to apply the same test on varied materials, just because the constructions are similar.

The bend test is a good case in point. According to the ASME code the purpose of this test is "to check the degree of soundness and ductility of groove weld joints." This implies that soundness and ductility are related. That's not always true. Consider a sponge.

Why Not X-Ray?—What will you learn about soundness from a bend test that is not already available from radiography? Suppose the bend test fails as a result of large slag inclusions in the test piece. Would the vessel be condemned even if there were no similar slag inclusions in any of the vessel's welds?

It has been known for at least 30 years that the tensile test can supply ductility information as well as the bend test. It seems absurd to re-

quire both of these tests on the same joint.

The bend test also becomes absurd when applied to welded joints which in general are a combination of somewhat hard and soft zones. Just because a bend-tested piece breaks prematurely, it doesn't mean inadequate ductility of the joint. It could be the result of widely varying properties in the weld, heat-affected zone and base metal.

Aside from the cost, it's not too hard to meet bend test requirements with welds made in steels. The same test requirement, however, makes no sense at all when imposed on some other material such as Al-4 pct-Mg alloys. Here the test requirement can prevent the use of these alloys for certain purposes.

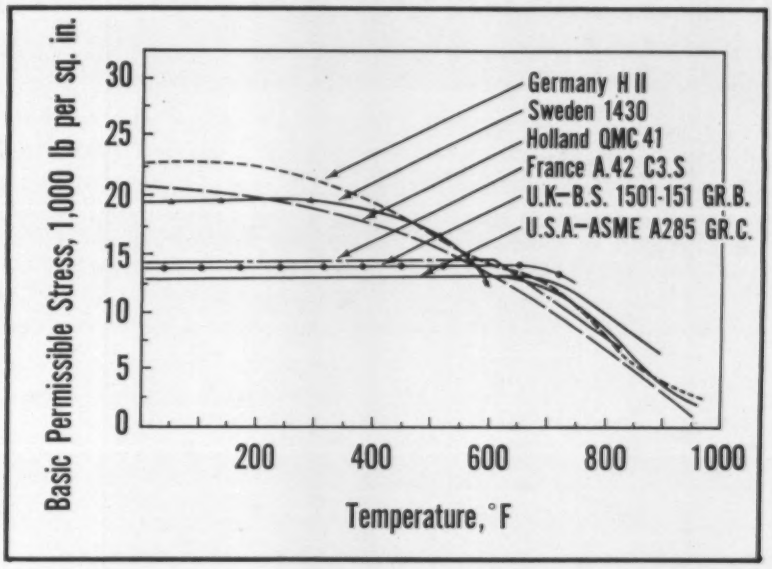
These same alloys offer advantages in the construction of pressure vessels for low-temperature processes and storage.

Aluminum Differs—The relative ductility of the different zones in an aluminum alloy weld is more widely variable as the result of different manufacturing variables than in steel. Such factors as increases in alloy content, cold working, annealing, final plate thickness and joint preparation also affect ductility.

Slow welds produce wider and softer heat-affected zones than fast ones. The factors that improve the strength of both weld metal and heat-affected zone tend to lower the ductility. Therefore, the strong, sound joints may be condemned for failing the bend test. On the other hand, soft and weak joints may pass.

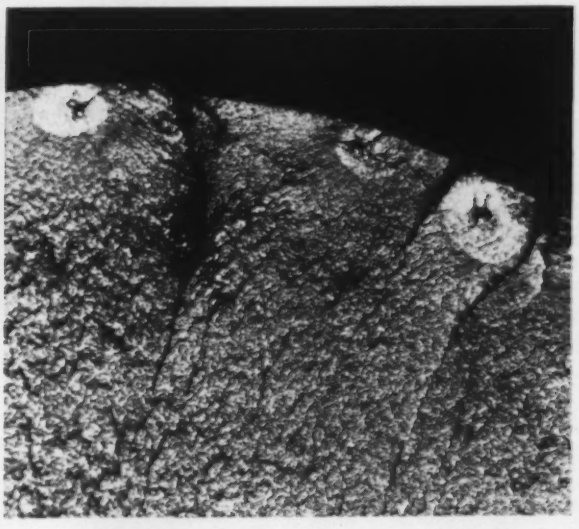
Once the defects have been found, the big question is: Can they be tolerated? Until lately, there was hardly any factual data which would have permitted this question to be answered sanely.

What Stress Is Allowed?



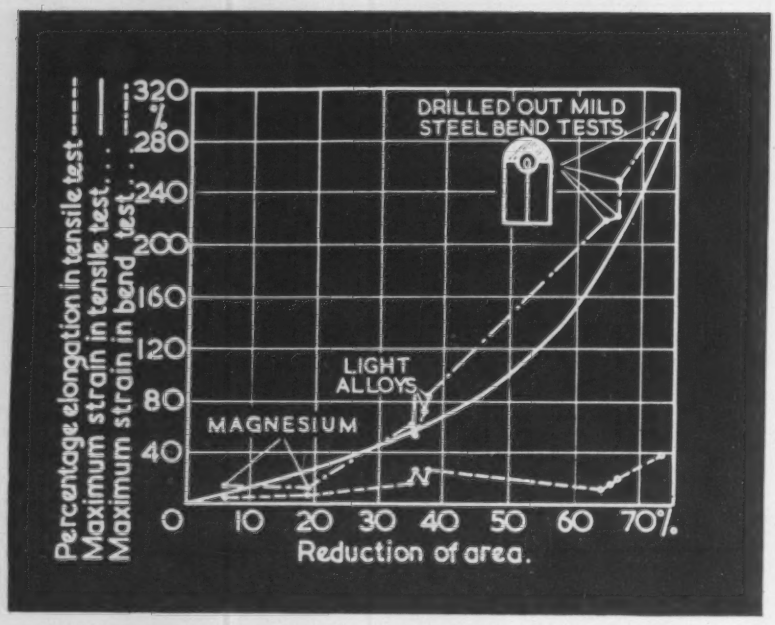
It's even more surprising that the ASME code specifies acceptable levels of porosity in pressure vessel butt welds. One cannot help thinking that these levels are based on speculation rather than fact as to their effect on strength.

New Evidence—The question of what is acceptable as a defect is very complex. The evidence that has been piling up indicates that a much higher level of defects, even in pressure



MILD STEEL SHAFT: Here are two examples of fatigue failure of reclaimed mild steel shafts. Fracture initiated at several sub-surface pores (right) has less effect on strength than the linear defect.

Harder Metal Takes Strain



DUCTILITY GAGE? Early fracture in a bend test doesn't always mean that ductility is lacking. Soft materials can take less strain.

vessel welds, can be tolerated than has so far been admitted.

In steel, gross porosity, slag inclusions and small cracks have hardly any influence on static strength or impact strength. Aluminum alloys, on the other hand, seem to have a lower level of tolerance.

However, when the problem of brittle fracture of welded steel construction is considered, defects which may not affect ductile strength may affect brittle strength. This is true for cracks or continuous lack of root fusion. Porosity doesn't seem to increase the risk of brittle fracture.

Area of Fatigue—Of course, fatigue strength depends on the size of stress concentrations. All defects introduce stress concentrations. It would seem natural not to tolerate any defects in constructions liable to fatigue stressing. But there's more to this than meets the eye.

Thorough studies on butt welds in pipelines have shown that their bending fatigue isn't affected at all by the presence of slag inclusions or lack of side fusion. The strength is really determined by the notch effect at the weld root.

The bending fatigue strength of shafts, however, reground after welding, is quite sensitive even to the presence of a few small pores in the deposit.

Starts and Stops—Fillet welds between the flanges of plate girders and the web seem to influence fatigue strength unfavorably when compared with an unwelded girder. This is the case even when the fillet welds are sound. Blame this on the starts and stops in manual welding.

Girders in which these fillet welds are made continuously by automatic welding have shown superior fatigue strength.

Butt welds in plate have shown a very high tolerance for slag inclusions and lack of root fusion. This is because the weld edge produces a stress concentration affecting fatigue strength more profoundly than internal defects.

You can relate the tension fatigue strength and the acuity of the angle between the plate surface and the weld reinforcement. Consider those welds in which the reinforcement is machined flush with the plate surface. Here, you determine fatigue strength by the rolled surface of the plate outside the machined area where fracture usually occurs.

Greater Leeway—It's clear from these facts that welds have a much higher tolerance for defects than is usually thought. Any adverse effect on static, impact, fatigue and brittle fracture strengths depends on many factors.

Also, it's impossible to legislate the permissible levels of defects as is done in the ASME code. What can be tolerated depends on many factors. These include material, the number of load cycles and the stress concentrations.

Does it make sense, for instance, to insist on the removal of slag inclusions and porosity by cutting out and rewelding? At the same time you must tolerate an angle of 100° between plate surface and weld reinforcement, such angles are common with automatic welding.

Each construction is almost a case by itself. A blanket code that covers differing services isn't fair. One thing is very clear, however. Why insist upon such high, costly standards when there is no real gain in strength and safety?

Time for a Change—Too many materials are wasted by a multiplicity of tests. These tests have to be performed. Some of them are devoid of all meaning.

The revolution that has been going on in the whole concept of design and strength of materials demands a change. We pretend that nothing has changed and continue to cling to the tests we used over 50 years ago when ideas on strength were primitive to say the least.

It's high time for some serious basic thought of the whole question of approval and testing.

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Hand Mill Paces Terminal Job

Automation sometimes bows to hand methods—depending on the application.

One company improved on a manual milling setup to get three cuts from every stroke.

■ By taking advantage of the high spindle speeds and rapid hand feed of a small milling machine one company saved 50 pct on production time and 33 pct on labor in the machining of terminals.

At the same time, the new method has increased accuracy by allowing three angles to be milled in each part without removing it from the fixture.

Rapid Indexing—The terminal is mounted in a holding fixture on the mill's table. This permits rapid indexing to cut the three different angles. Climb milling is then used to produce the fine surface finish the work requires.

The rigidity of the mill, a product of U. S. Burke Machine Tool Co., Cincinnati, makes it possible to use the climb milling. One screw tightens the part in the fixture. By feeding with the longitudinal rack handle production speed is raised to the operator's maximum efficiency. He simultaneously feeds the head up and down.

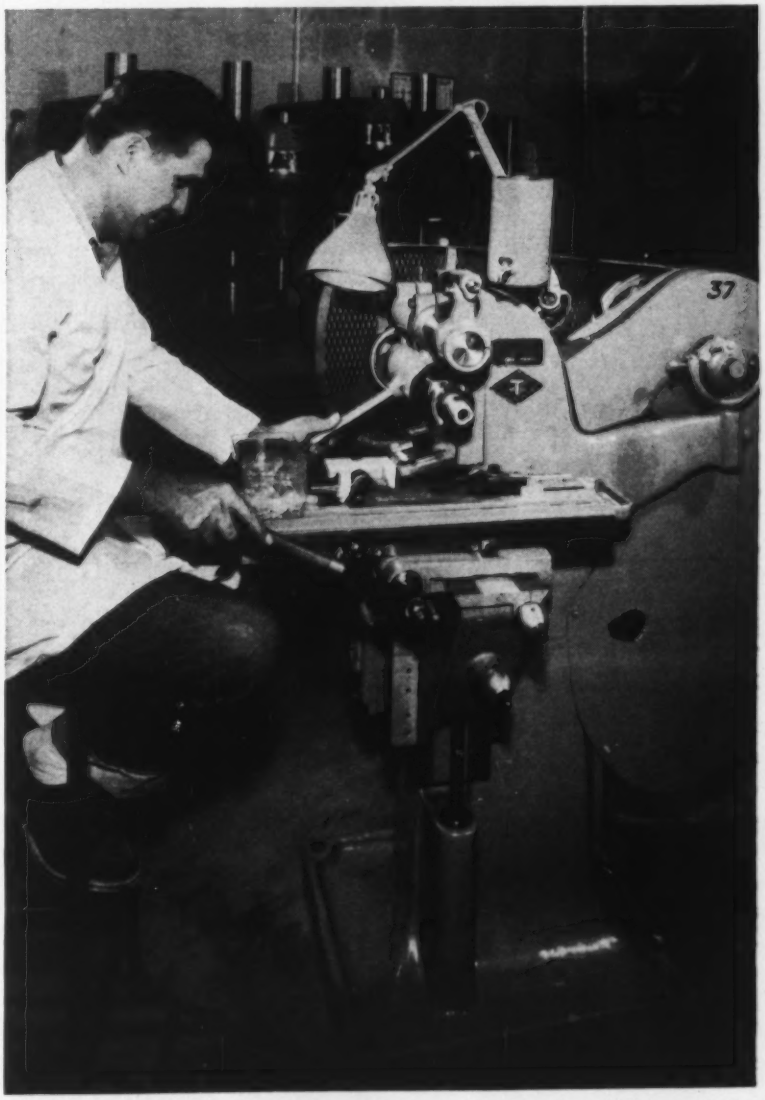
According to the Technology Instrument Corp. of Arizona, Tucson, the mill has cut operation costs. The machine's simple heavy-duty construction, together with few moving parts, have kept the mill maintenance free. Only lubrication is required.

Feeds and Speeds — The milling machine's spindle speeds range from 200-2000 rpm. Speed changes can be made quickly since the drive is from the motor to countershaft, and countershaft to spindle. This is done by means of a B-section V-belt. The countershaft rides in precision ball bearing housings.

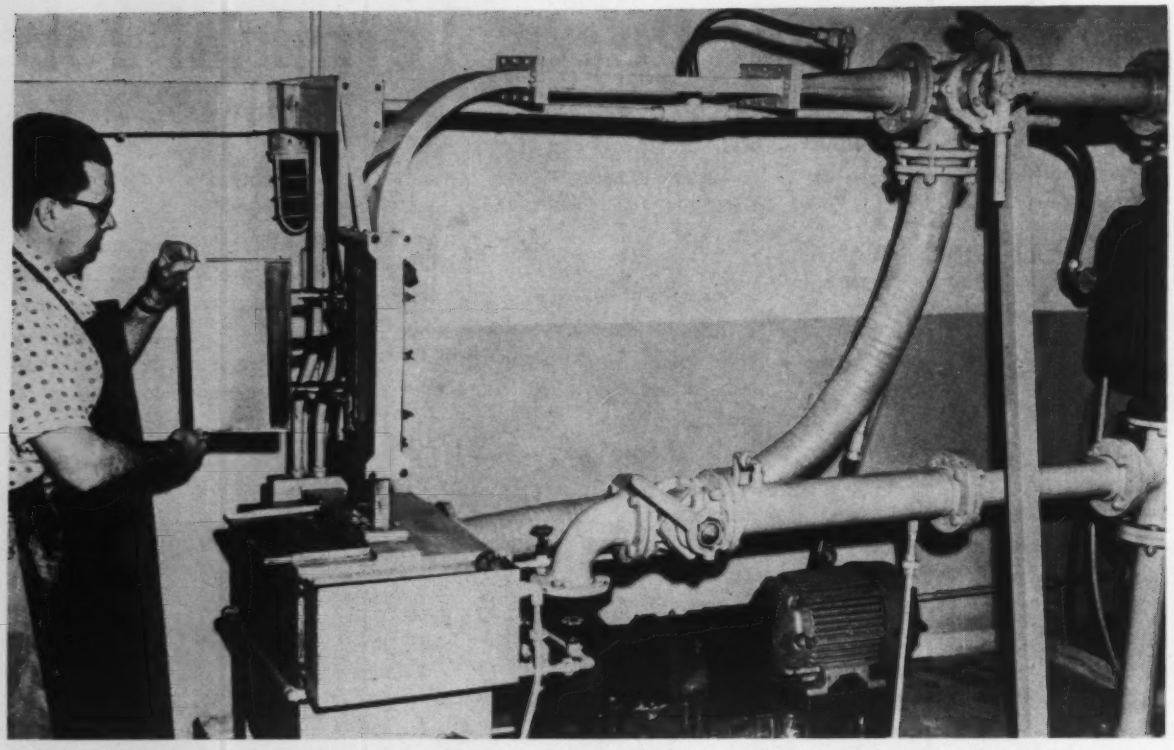
The small mill can also be used for keyways, sawing, slotting, squaring, cut-off, short run splining and light slab milling.

Versatile Mills—Hand-feed milling machines have proved desirable for production jobs throughout all types of industry. The units can handle just about all types of materials. The proper size machine for a given part always provides optimum economy.

While the mill's rapid hand feed is of distinct advantage on the terminal job, it has also achieved excellent results when equipped with air-hydraulic feeds. This setup was used for completely automatic milling of germanium for transistors, and for semi-automatic stake notching of shells.



PUSH-PULL ACTION: The hand-operated mill cuts three different angles in each terminal without removing the part from the fixture.



CIRCULATING CELL: The tin-plating solution is pumped through the plating compartment. The compartment contains the strip sample and the tin anode. The solution continues downward into the reservoir.

Strip Mill Applies Simulator To Guide Tinplating Line

Automatic tin-plating lines stay on the right track with off-line process control.

Process time is held to a minimum, with exact results at one company, since a line simulator was installed.

■ There are many variables in a tinplating line which affect product quality. Thus, many companies are now setting up simulators before putting continuous tinning lines into high gear.

One plating factor not properly controlled could easily produce untold scrap losses—when one considers that the average mill runs off between 800-2000 fpm of tinned strip.

Upon request from Kaiser Steel Corp's Fontana Works, designers for Industry, Inc., Cleveland, designed an electronic tin-line simulator.

The compact laboratory device now provides Kaiser with data to meet any tinplating need. If, for example, a user requests a certain crystalline structure or surface brilliance, the simulator easily sets the necessary parameters to meet the need.

Full System—The electronic tin-line simulator consists of a circulating cell, a conduction reflow system and a brilliance comparator.

The circulating cell contains a 25-gallon capacity electrolyte reservoir, a centrifugal pump and a magnetic flowmeter.

The pump pushes the solution upward through the magnetic flowmeter and on through the plating compartment. The plating compartment contains a 6¼ by 3-in. strip sample and the tin anode.

Improves Finish — The conduction reflow system actually remelts the deposited tin plate. This is done during the final phases of the process to provide a lustrous finish to the plate surface.

Either of two processes can be employed to remelt the tin. One

Unit Sets These Parameters

Plating current density
Velocity of strip
Electrolyte temperature
Reflow current
Reflow cycle
Quenching time
Brilliance of coating

process calls for current to be passed through the strip. The power losses, being resistive, heat the strip enough to melt the tinplate.

The other method which is widely used for remelting is induction heating. After the tin has melted, it is quenched rapidly to maintain a high luster.

Reflects Luster — The brilliance comparator is a simply designed Reflectometer with a variable intensity light source. To determine the difference in luster of various samples, the unit must first be calibrated to a given standard.

To calibrate, a rear-coated mirror is placed on the magnetic clutch. The light source is varied until a maximum reading of 100 foot-candles appears on the meter face. The mirror is then removed and a sample securely locked in place—the reading again being noted.

This reading gives an indication of relative reflectivity. The procedure is repeated for each sample thus tested giving an accurate indication of the relative reflectivity between samples.

Design Factors — The simulator meets the various environmental conditions of the continuous tinning process.

The tin-line simulator is compatible to both acid and alkaline plating methods. To do this, it meets the operating temperature needs of either electrolyte. These temperatures are accurately controlled to about ±2°F.

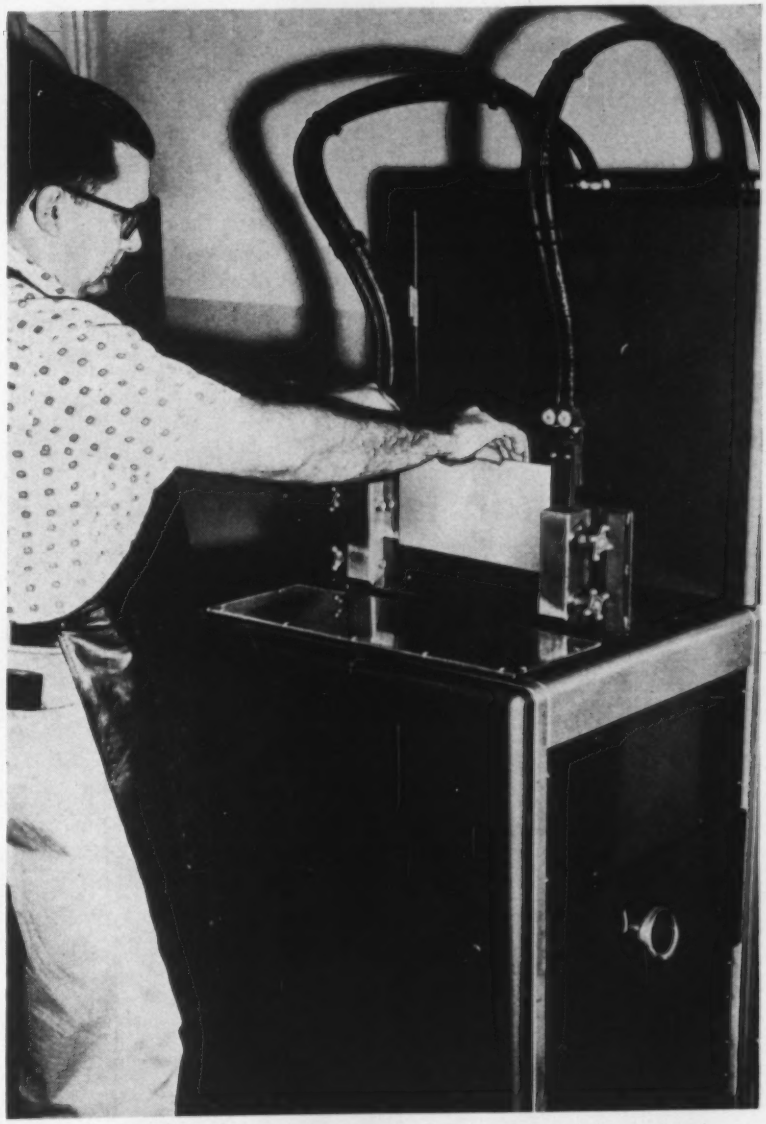
The electronic simulator can operate in a wide range of speeds. Also provided are the high current densities needed in the alkaline process.

Considers the Man—The system was designed for ease of operation. Interlocking devices, built into the unit, safeguard the laboratory technician.

Variables such as speed of electrolyte, plating time and temperature of electrolyte are visible to the operator for immediate recording.

The use of a tin-line simulator in the research laboratory or the mill laboratory of the plated-steel strip manufacturer can lead to better control of the continuous plating process. In fact, it serves as an off-line process control instrument.

Compactness was the byword for the simulator's design. Thus, the unit can be moved easily to any given area. To put the tin-line simulator into action, only water and current are needed. The power needs are 220 or 440-v current.



PROVIDES LUSTER: Tin-plated surfaces are remelted by resistance or induction means to provide a lustrous finish to the tin's surface.

Machine Steps Up Paint Mileage

Oscillating-Reciprocator Jets Paint With Flow-Coat Action

By **E. A. Zahn**—Industrial Finishes Consultant, Louisville

Swinging a full 10°, while moving back and forth on a 12-in. stroke, 8 little streams of paint coat complex parts.

None of the paint is wasted. Every drop flows on in a continuous, uniform film.

▪ Since the discovery of production spray-painting methods more than 50 pct of all industrial paint has been wasted. For years, this waste has been tolerated as an expedient for mass production.

Nevertheless, waste can never stay hidden for long. You can't afford to waste paints and solvents any more than you can afford to waste steel or other raw materials.

Profits Blow Away—It's hard to gage the millions of dollars worth of purchased paints that never contact the products being painted. Compressed air blasts these mixed paints to bits. Then exhaust systems draw off more than half the paint mixtures.

The waste doesn't stop at this point. Waste breeds waste. Unused paints, blown out of the exhaust systems, contaminate the air. Some of these paint particles may even drop on cars in plant parking lots.

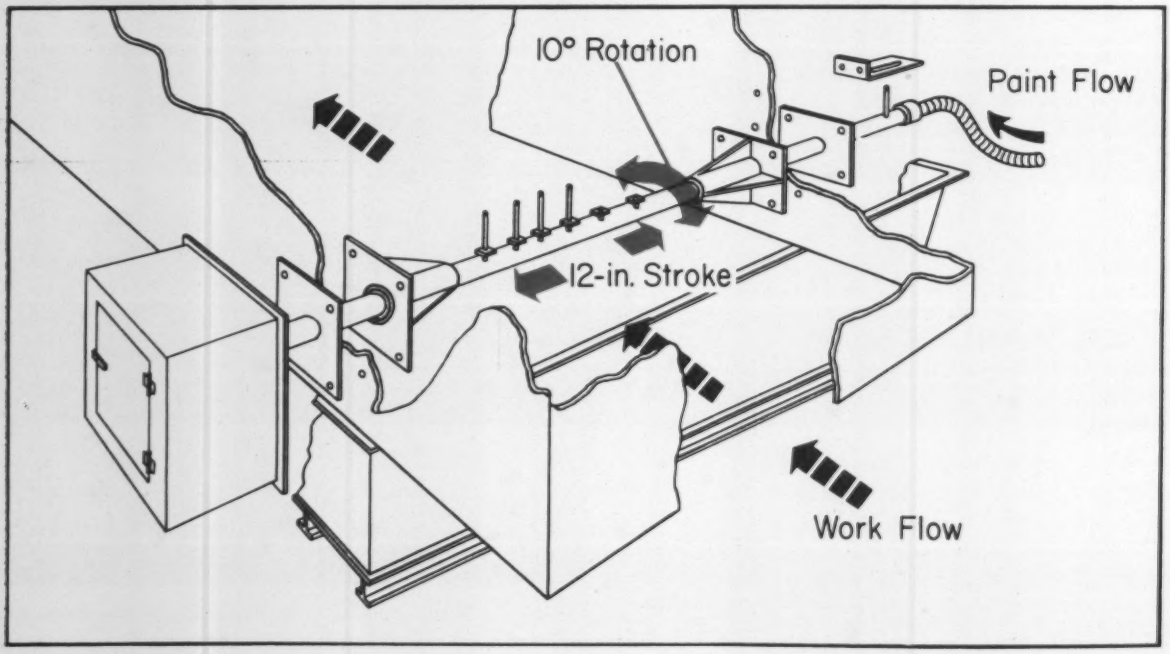
There are many other places where this waste shows up. Consider the sludge that collects in wash-water booths, the dry scrapings on painting-booth walls and even the dried-paint particles that fall from conveyor chains. All of this wasted paint can be put to profitable use.

Follow Trend — Many metalworking plants tend to follow developments set forth by automotive manufacturers. Wherever practical, automakers are breaking away from conventional spray-painting methods.

Flow-coating machines have made inroads in American auto plants. However, there is no present indication that any full-sized American car will, in the near future, be flow coated after assembly.

In this country, flow-coating setups prime and finish paint sheet metal in auto plants. Main use for these automated setups centers on fenders and trunk lids. In Europe, on the other hand, flow-coating machines apply some final-finish-paint coats after the cars are assembled.

Dual Motion Is Heart of New Flow Coater



Uniform Coatings—Along with cost factors, there's another good reason for the switch to flow coating. With flow coating, there are no inaccessible areas. Even overlapped seams are scaled. All paint films, regardless of thickness, are continuous and uniform.

A flow coater is not, and never should be, considered a catalog item. Many companies make flow-coat equipment. Some of this equipment is very effective; but some still leaves a lot to be desired.

The recent development of reciprocator-type flow coaters proves quite timely. This French development solves two serious problems in flow coating. It reduces solvent loss to about 1 gal per working hour. It also speeds color change-overs.

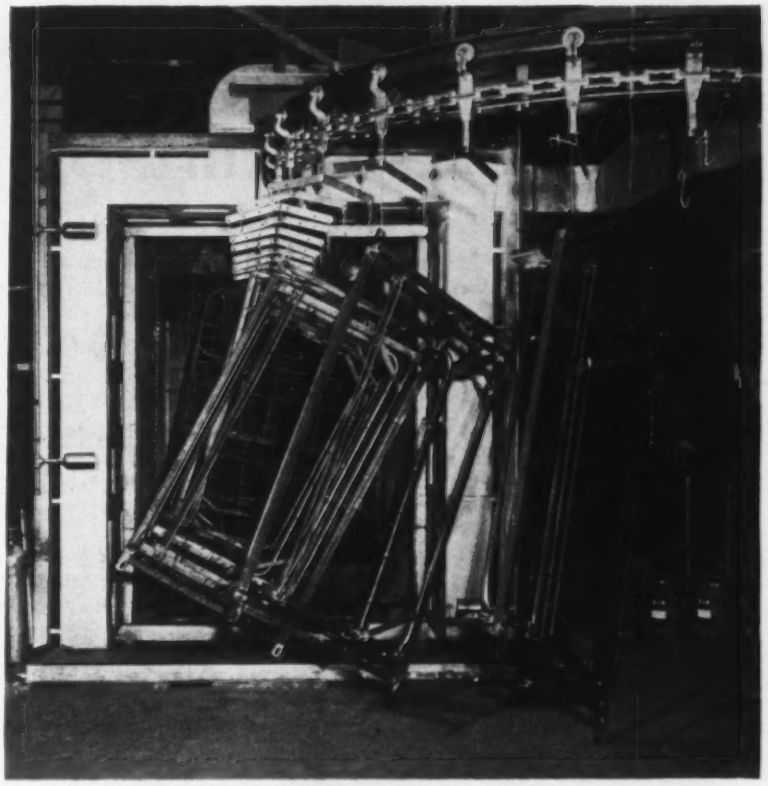
This development makes flow coating a 100-pct utilization method. If a gallon of paint boasts a theoretical coverage of 650 sq ft per mil thickness, the new flow coaters cover 650 sq ft with each gallon of purchased paint.

Take Your Pick — American equipment builders, using a French license and their own refinements, offer the reciprocator units in many forms. These units are sold as conversion packages for washer-type flow-coating systems, as reciprocator flow-coater bases for competitive builders and as complete self-contained machines.

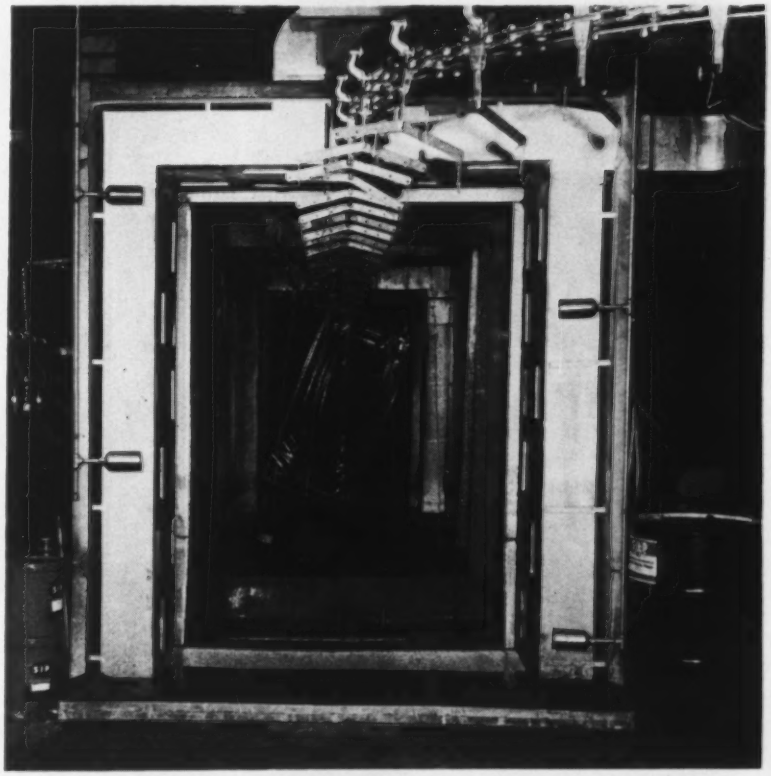
Many potential users believe that flow-coating equipment is expensive. These people should check facts and figures.

Uniform Coatings—Flow coating yields uniform products. This is a great sales asset. With automated setups, minor corrections and improvements take place as parts move through the flow coater. End result is near-perfect finishes.

Jet streams in the reciprocator strike the parts as they're conveyed through the machine. The pictures with this text show some of the complex metal shapes that are flow coated at The United States Bedding Co., St. Paul.



AUTOMATIC SETUP: Conveyor carries metal frames through machine.



SHORT RUN: Full working-material load requires only 50 gal of paint.

Aluminum in Stainless Alloy Improves Machinability

To ease machining, steelmakers add sulphur to stainless alloys. But this causes two undesirable side effects.

With 0.7-pct aluminum, a new free-machining stainless eliminates the double drawbacks.

■ A new chrome-nickel stainless alloy boasts many advantages over free-machining AISI Type 303 stainless steel. The newcomer features improved corrosion resistance, easier machining, longer tool life and smoother finishes. It also resists longitudinal splitting.

Users report that the new alloy, called Uniloy 303MA, yields 15-40 pct savings in machining rates.

Sulphur Problems—Regular Type 303 stainless contains about 0.25-pct sulphur. This is the key to machining ease. However, the high sulphur content creates problems. It reduces corrosion resistance and sometimes causes splitting.

By adding less sulphur and introducing 0.7-pct aluminum, the Universal-Cyclops Steel Corp., Bridgeville, Pa., solves both corrosion and splitting problems. This combination of elements improves machinability while reducing sulphur's harmful effects.

The tendency of Type 303 to split during fabrication or in service proves quite costly. This drawback also limits potential uses for free-machining stainless steel.

No Splitting — Uniloy 303MA overcomes this splitting problem. For example, cylindrical parts with 0.160-in. ID holes have been expanded to 0.250-in. ID, without splitting. Similar parts made of Type 303 split as they were expanded to 0.185-in. ID.

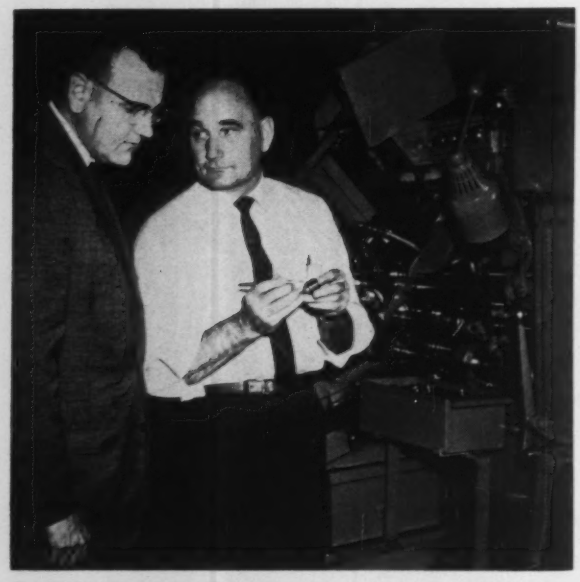
Alloy Has Little Sulphur

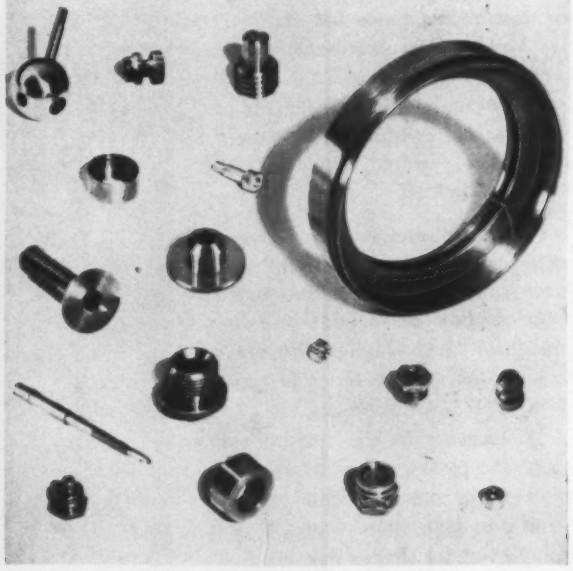
Typical Analyses, pct

Element	AISI Type 303	Uniloy 303MA*
C	0.1	0.1
Mn	1.5	1.5
Si	0.5	0.5
S	0.25	0.13
Cr	18.0	18.0
N	9.0	9.25
Mo	0.5	0.5
Al	. . .	0.7

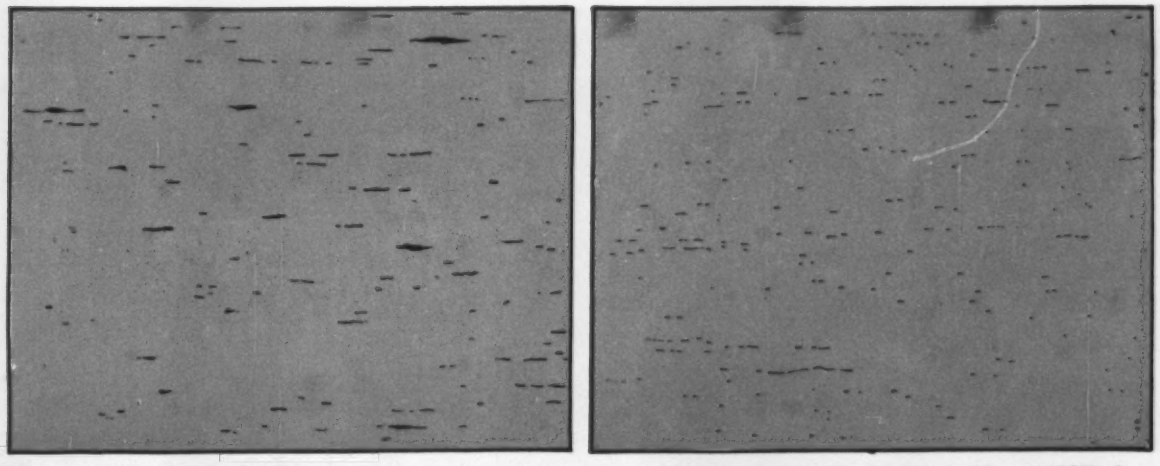
*Patent No. 2,900,250

Some of the jobs that hinge on free-machining chrome-nickel stainless steel also require some cold-forming operations such as mild upsetting. Type 303 stainless causes a high percentage of failures in upsetting. Whenever 303 is cold formed,





EASILY MACHINED: The Olson Mfg. Co., Worcester, reports a 32 pct savings in production time. Picture on right shows some of the parts made from the new free-machining stainless. Tool life is also improved.



NON-METALLIC INCLUSIONS: Mechanical and corrosion-resistant properties of Uniloy 303MA hinge on low sulphur content. Photomicrographs at 100X show inclusions in Type 303 bar (left) and in new alloy.

100-pct inspection of all finished parts is a must.

Major Savings — F. J. Wilson, methods manager, Sealol, Inc., estimates that his company will save about $20,000 a year through use of Uniloy 303MA. This Providence, R. I., company uses the new alloy to make mechanical seal-cap retainers.

Commenting on a test run of 500 parts made from Uniloy 303MA, Mr. Wilson states: "Production rates are up 15 pct. Tool life has been increased 25 pct. Final finish is improved 15-20 pct."

Formerly, all retainers made from regular 303 had to be checked. With Uniloy 303MA, only 15 pct of the finished seals are inspected. Thus, inspection costs drop 600 pct.

Another Example — The T. J. Murnick Mfg. Co., Inc., Cleveland, makes small stainless-steel plumbing fixtures. This company decided to compare Type 303 with Universal-Cyclops 303MA. The shop ran off 1000 pieces at various speeds and feeds.

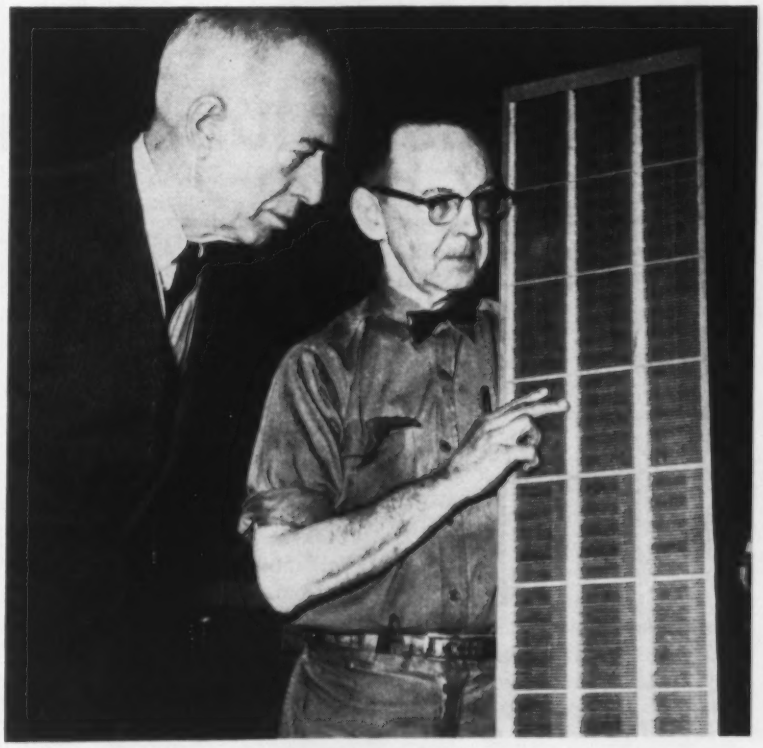
Here are the results. With Uniloy 303MA, spindle speeds on automatic screw machines were increased 455 rpm, up 40 pct. Cycling time was reduced from 40 to 30 seconds, down 25 pct.

Tests on these plumbing fixtures prove that 303MA is 30 times more corrosion resistant than regular 303 stainless.

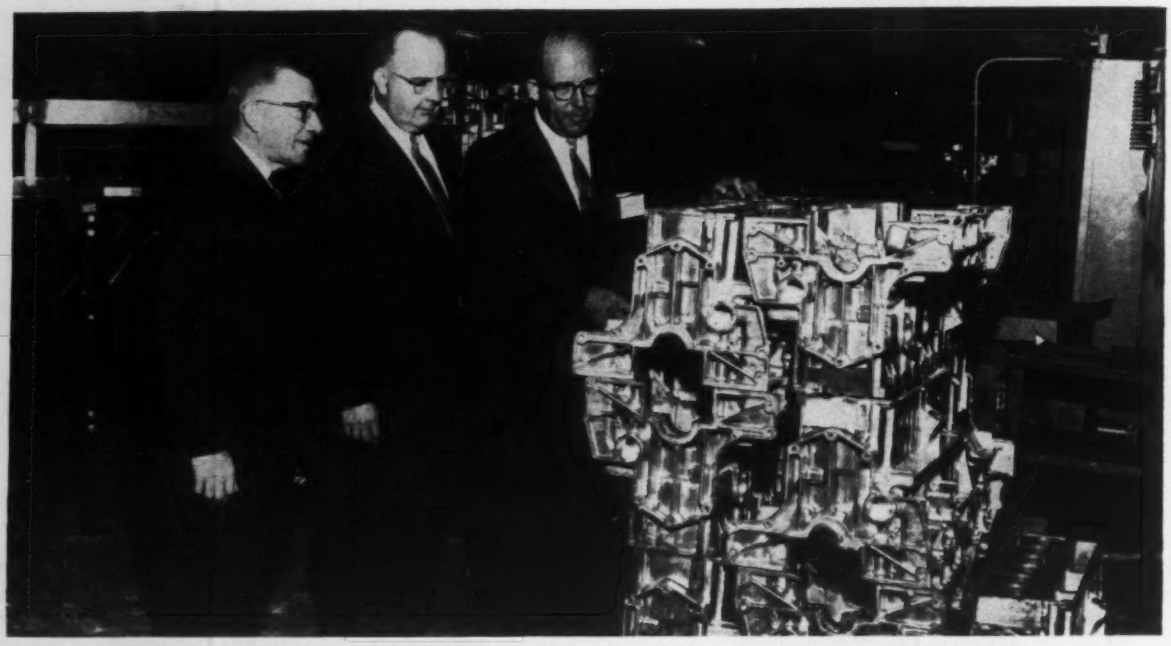
Fastener Uses — The Klincher Locknut Co., Inc., Indianapolis, makes locknuts, lock washers and general screw - machine products. Using Uniloy 303MA in lieu of AISI Type 303, these parts are made faster — with better surface finishes.

A test run of 3000 nut blanks proved out Uniloy 303MA's machining ease. Half of these blanks were formed from 303; the other half from 303MA. All blanks were machined on a multispindle screw machine.

The Type 303 blanks were machines in 28 second each. Uniloy blanks were finished in 20 seconds.



SCREEN PRODUCTION: E. H. Hall, president of the Fitchburg Screen Plate Co., Fitchburg, Mass., cites Uniloy 303MA for improved finishes.



FINE DETAIL: Frank Koegler, vice pres. and gen. mgr., Doehler-Jarvis Div., National Lead Co., E. W. Bernitt, vice pres., American Motors, and Dr. A. F. Bauer, also with Doehler-Jarvis, inspect diecast blocks.

Production Setups Extend Scope Of Diecast Aluminum Engines

This year, aluminum engine blocks serve in full-sized six-cylinder automobiles.

Costs are competitive. So is overall product quality.

By **R. H. Eshelman,**
Machinery Editor

■ Mass production of diecast, aluminum engine blocks represents a major advance in metalworking. Standard aluminum six-cylinder engines, in American Motors and Chrysler cars, prove that both technical and cost barriers have melted away.

Until recently, 20 lb was the size limit for aluminum diecastings. Now, special machines yield 70-lb castings.

These machines use 2000-ton locking pressures. A 7500-lb aluminum-holding furnace rounds out the new setup at National Lead's Doehler-Jarvis Div. in Toledo.

Weight Savings—Automakers admit that the main bonus offered by aluminum engine blocks centers on weight savings. With all the accessories and horsepower added to cars in recent years, it's hard to maintain front-end weight control. This affects overall balance.

Aluminum saves 70-80 lb on a standard six-cylinder engine. Weight reductions are just as attractive for small, compact cars. Four new compact models with aluminum engines entered the market this year.

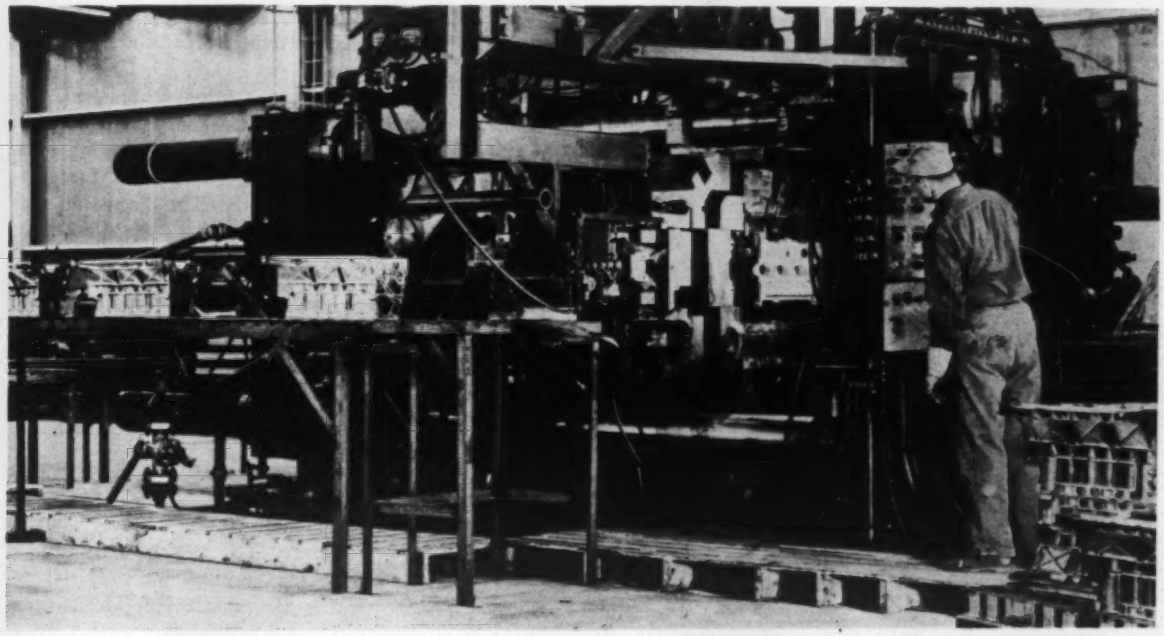
Other Advantages — Of course, aluminum blocks offer other engineering and production advantages. Recent developments assure precision diecastings for standard-sized engines.

According to E. W. Bernitt, American Motors' vice-president of automotive operations: These developments afford ". . . a big step in the direction of improved manufacturing quality."

Mr. Bernitt reports one of the main reasons for going to diecast blocks was to boost quality control. The new casting process removes the chances of human error.

It also precludes many machining operations. Oil passages and bolt holes are now cored in place.

With the lightweight blocks, you can use faster machining speeds. And the inherent accuracy of the diecasting process allows reduced



FAST WORK: With 2000-ton locking pressure, special machine turns out 20 aluminum blocks per hour.

tolerances. End result is clean castings, without sand cores, core wires or loose-sand problems.

Design Problems—A switch from conventional cast-iron to aluminum diecastings creates a few problems. One of the biggest is the avoidance of undercuts.

If undercuts are made, loose inserts must be used to pad out the errors. Loading and unloading of these inserts extends diecasting time. It also raises production costs. To prevent "burn-offs," die cores must be designed for proper heat flow. Also, you have to avoid heavy sections.

Excess mass can cause metal porosity. Thus, you should use indentations to get thinner, more uniform wall sections. This saves metal and cuts down overall weight.

Wear and production problems pose other barriers.

Cast-In Liners—For many years automotive engineers debated the merits of three types of aluminum engine cylinders. One is integral cast-steel cylinders that are bolted in place as "wet-sleeve" units.

The second, or "dry-sleeve" solution, is to cast gray-iron cylinders in place.

A third method revolves around the use of a wear-resistant aluminum alloy that requires no lining. Or, as a take-off on the latter method, you can use a metallic coating on the cylinders' aluminum walls.

Common Conclusion—Based on separate tests, both American Motors' and Chrysler's engineers chose dry-sleeve cast-in inserts as the most practical production method.

Doehler-Jarvis uses centrifugal cast-iron liners with rough outer surfaces. According to the company's technical expert, Dr. A. F. Bauer, this gives very good results.

Molten aluminum, under high pressure, penetrates the fine crevices of the rough-surfaced liners. To avoid thermal shrinkage, all liners are preheated before they enter the diecasting machines. The resultant bi-metallic interlocks boast a shear strength of 18,000 psi at the bond.

Machine Development — The main factor behind this breakthrough, was the development by Doehler-Jarvis of what's claimed to be the world's largest diecasting machine. This unit attains a locking pressure of more than 2500 tons.

As early as Dec. 1955, six-cylinder test blocks were made with this giant machine. These were the wet-sleeve type. Later, somewhat smaller units were designed for production work on the new engines.

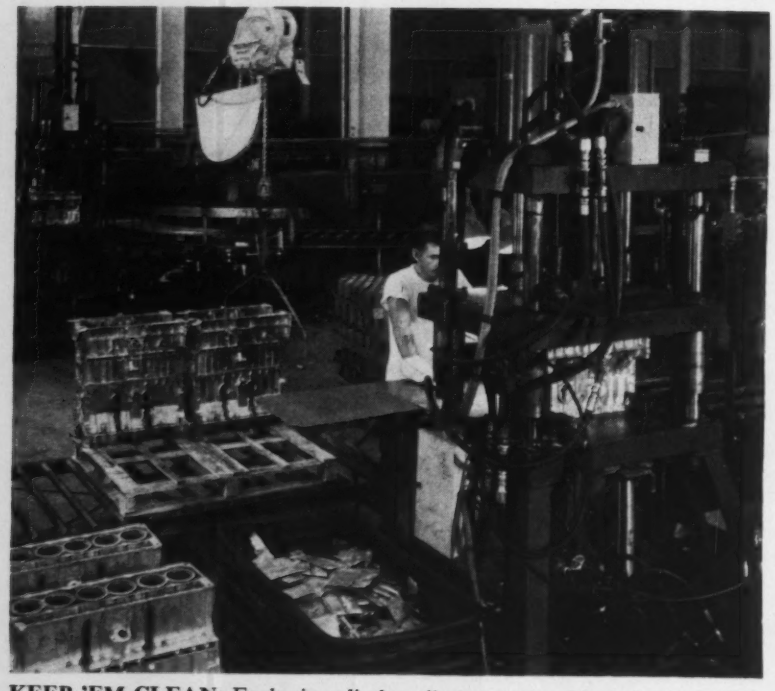
The production units inject 65 lb of molten aluminum in less than a second at 8000-lb pressure. Chilling time is 30 seconds. Eight loose pieces, six cast liners and two camshaft-bearing-bore parts go into each cylinder block. A mechanized loader positions these parts in the dies. Then the preheated parts are manually placed on the loaders.

Each machine has automatic fixtures for ladling, loading and unloading. A bridge at the top of every unit carries these automated devices. The working cycle is controlled from a push-button console.

Big Operation—Three men work on each machine. The operator is responsible for production. A helper on one side loads the gray-iron liners into the loading station. He also cleans dies.

The third man operates the hy-

PRESSURE TEST: All blocks undergo pressure tests prior to shipment.



KEEP 'EM CLEAN: Each six-cylinder, diecast engine block is thoroughly cleaned. The complex cored holes require no follow-up machining.

draulic press. He visually inspects each part and keeps production records.

After a casting is finished, the operator adjusts an unload control. This device drops the casting onto a conveyor. At this point, the casting is gate free. The diecasting unit removes the gate, as the die opens.

Complex Dies—The movable die on each machine weighs about 25 tons. It's quite complex. In fact, it contains 60 separate pieces of H-13 steel, keyed and bolted together. This hot-work die steel is commonly used in auto plants.

However, in casting 70 lb of aluminum per shot, the steel is subject to greater - than - normal thermal stresses. To avoid early "heat checking" around the gate, all 60 pieces are replaceable. This insures a clean impression.

Holding blocks for the dies consist of heat-treated low-alloy steel castings. Forgings for such large parts aren't available.

Cooling Is Vital—Other problems cropped up in diecasting the large blocks. Heat balance became critical. Long, thin cores overheat when they're surrounded by large hot sections of aluminum. This can cause cracks. Therefore, cooling of all exposed die sections is a must.

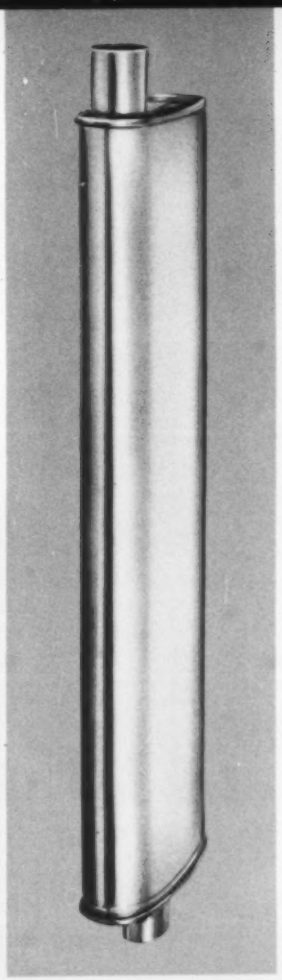
To preclude this problem, one die design uses 70 separate cooling systems. Also, every casting has more than 140 cored holes.

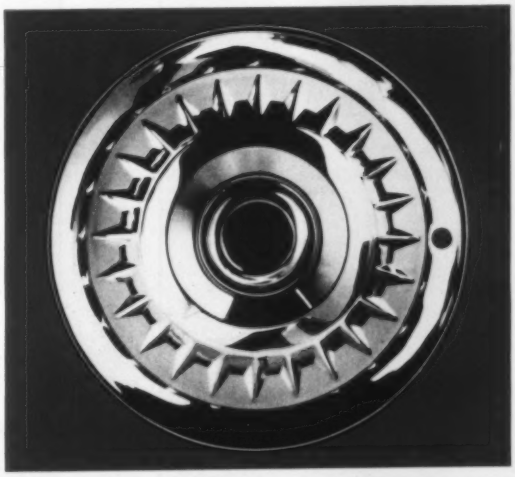
Small cores could create headaches due to breakage and wear. But the machines and dies have been designed to speed replacement of broken cores.

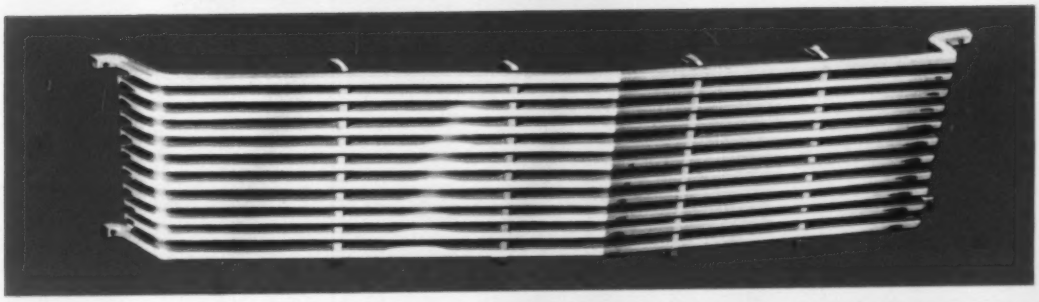
An example of the savings possible with diecastings lies in the handling of a troublesome oil-gallery hole. In the design of one block, engineers saved both material and machining time by turning to cored holes.

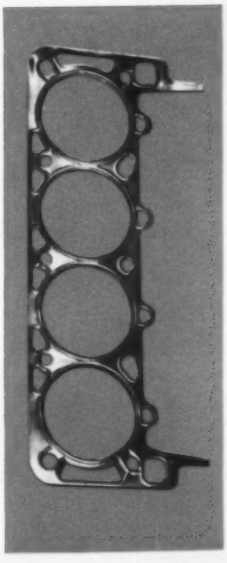
In sand-cast iron blocks, the boss for the main oil gallery runs the length of the block. It's cast solid and requires 12 follow-up drilling passes. With the new block the entire passage is cored. No machining is needed in the oil gallery.

Automotive Horizons and Allegheny Stainless...

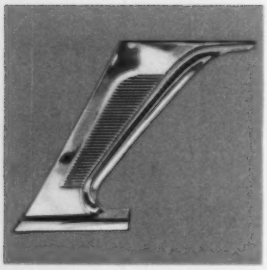


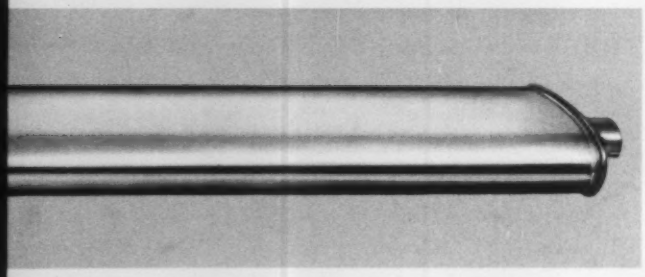






Twenty-five years ago, six special '36 Ford V-8's were made of Allegheny Metal, today's Allegheny Stainless. They proved that nothing lasts like Allegheny Stainless. On the car shown above, tires wore out, shocks had to be replaced, yet the stainless was like new. Gears and transmission wore out. Mileage passed 250,000. Still the stainless was like new. Now a veteran of four engines and 400,000 miles, the Allegheny Stainless is just as good as it was when it left the factory—always stainless, always like new.





This T-Bird is all Allegheny Stainless. The Budd Company, fabricators of Thunderbird bodies, made the parts on its regular production dies from Allegheny Ludlum stainless steel taken from a regular production run. Ford completed the car and rolled it from the regular assembly line for delivery to Allegheny Ludlum. Body work is Type 302 stainless with a special satin finish; muffler, bumpers are 302. All trim is Type 430, mirror finish.

This Stainless 'Bird won't lose its plumage

Twenty-five years from now, this 1960 stainless steel Thunderbird will still look showroom new. Time won't dull its luster any more than it has the special 1936 Ford V-8—also made from Allegheny Stainless.

These cars, built 24 years apart, were made for Allegheny Ludlum as practical demonstrators of the long-lasting good looks of Allegheny Stainless, its corrosion resistance, its strength, and its ease of fabrication and joining.

A-L will display the new car—along with its new-looking older sister—at auto shows, in fairs, and exhibits to stimulate consumer interest in the lasting value of the stainless now being used so effectively on American automobiles.

No other material can keep pace with stainless steel. When you need beauty and practicality...long life... unexcelled engineering performance...you can rely on Allegheny Stainless, by the leading stainless supplier to the automotive industry.

For even better cars tomorrow, Allegheny Ludlum's research is constantly developing new stainless steels and new uses for existing stainless steels.

Even Stainless pops up with problems..

As you would expect, the growth and development of even stainless steel automotive applications have not been without some dark moments. With Allegheny Ludlum's considerable background in the automotive applications, and even greater experience with stainless steel in a demanding variety of industrial environments, it came as a distinctly unpleasant surprise to learn that certain automotive trim parts of stainless were not standing up. Neither were other metals, but stainless must stand up.

BRIGHT ANNEAL FINISH

Isolated reports began to filter in from various locations throughout the country complaining of a frosty white etch appearing on Type 430 trim and molding components. Allegheny Ludlum's examination of the problem revealed that this condition was due to increasing use of road salt for snow removal. Other factors were processing changes made at the mill to meet the fabricators' demands for brighter strip finishes to reduce buffing costs.

Extensive research suggested that this condition was probably due to the final pickling operation given bright automotive strip. In processing, the strip was annealed conventionally which formed a thin oxide layer on the strip. Pickling was necessary to remove that oxidation. But heavy pickling tended to produce a duller finish. The problem was to eliminate or minimize the pickling that was needed to remove the oxide layer.

The automakers spelled out this problem: In addition to developing a finish that would resist this corrosive road condition, come up with a finish that was even brighter than before. Allegheny Ludlum analyzed its experience with smaller equipment where stainless steel was annealed in a vacuum or an inert atmosphere. The surface oxide was avoided and, therefore, so was the final pickling treatment. Result: better corrosion resistance than obtained in the past and a brighter finish.

The solution involves annealing stainless on a continuous, tonnage basis in a pure, dry hydrogen atmos-

..and here's how A-L solved them

phere which permits no oxidation or scaling, and keeps the surface clean and bright. A new Allegheny Ludlum furnace—the largest of its kind ever built in this country—went into full production on November 1, 1960, giving Allegheny Ludlum the tonnage capacity to service the automotive industry with Bright Annealed Allegheny Stainless Strip in all automotive stainless types in the brightest, most corrosion resistant state.

NEW—SUPER CORROSION RESISTANT A-L 433

Another problem faced recently was that of pitting and crevice corrosion on trim in certain, specific areas of the United States. After much investigation by the automotive companies and the stainless producers, it was believed that it was due to increased use, in combination, of deicing materials—salt, calcium chloride, slag, cinders—during winter in some sections of the country.

After extensive research in A-L's laboratories, a new steel to combat these conditions was developed. Tentatively called A-L 433 and patent applied for, it is an improved Type 430 alloy with the greatest corrosion resistance of any of the straight chrome stainless steels. Molybdenum is added to improve corrosion resistance against general pitting and copper is alloyed to enhance the moly in combatting crevice corrosion.

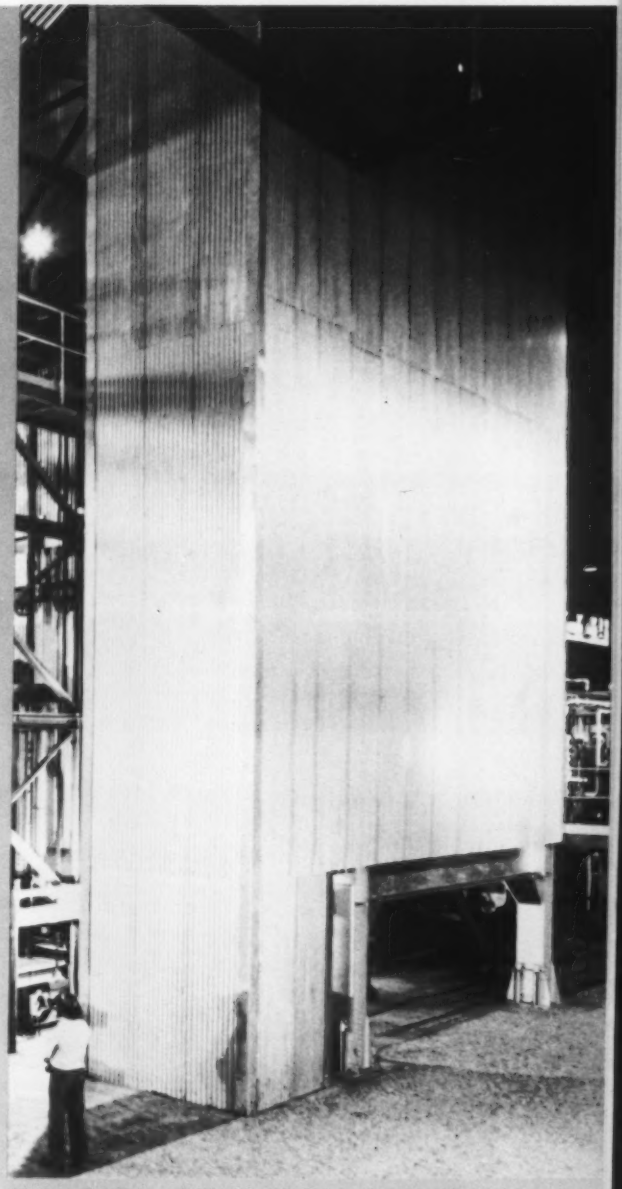
Available now, and at no premium in price over standard Type 430, A-L 433 should end the isolated complaints of pitting and crevice or joint corrosion, which has been called "red or back rust" in automotive slang.

MINIMUM ROPING TYPE 430

Another vexing problem reported, even though it was by no means universal, was roping. Some of the fabricators were running into this phenomenon which showed up as a lightly furrowed, wrinkled appearance, marring the surface of the finished part after severe stretching operations had been performed.

Heavy buffing, resulting in unusual costs, was required to eliminate these lines. Occasionally, it meant rejections. Considerable investigation and research has resulted in a special stainless steel strip with low roping characteristics. A combination of alloying and processing resulted in uniform ductility across the strip. A-L Type 430, low rope quality, is already in use in these applications.

And so, one by one, as unusual design, fabricating, and service conditions dictated, the problems of stainless in automotive service have been met head on and dealt with by Allegheny Ludlum in cooperation with the nation's leading automakers and fabricators. With its research and service teams, with its extensive production facilities, A-L expects to lead the way to the increased use of stainless steel in the automotive designs of the future.

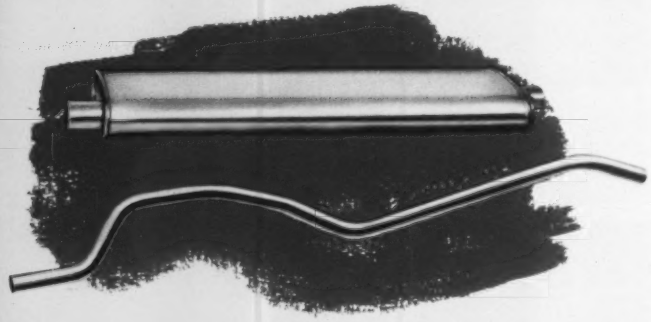


Allegheny Bright Annealed Stainless Strip is produced in this special continuous annealing furnace, on line at Allegheny Ludlum since November 1, 1960. Bright annealed strip results in a more corrosion resistant and brighter finish.

STAINLESS...a growing force in today's automotive design

The continued improvement in stainless steels and the increased demand of today's motorists for attractively styled automobiles that stay attractive have combined to throw open the door to more and more stainless automotive applications. And longer warranties are pushing the trend to stainless. Here are some of the places you're most likely to find Allegheny Stainless on cars today... or maybe tomorrow.

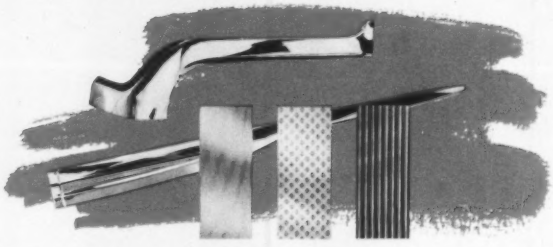
Mufflers and Tailpipes



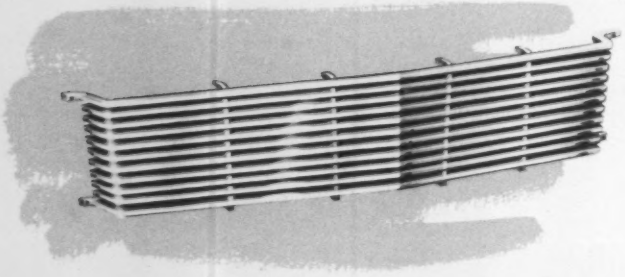
It's long been admitted by automotive people that a car shouldn't have one of its components operating in a hot, highly-corrosive environment without real corrosion resistance built into that part. But it's been a cost problem. Allegheny Ludlum's answer to the muffler problem is MF-1, a special, economical, ferritic stainless steel with good formability and corrosion resistance. Mufflers made from MF-1 have corrosion resistance built in. The stainless is solid. There will be mufflers made entirely from MF-1; others with MF-1 in the corrosion-susceptible internal wraps and baffles only. In either case, this corrosion resistance won't chip, peel, or burn off.

Trim

Nothing enhances the beautiful lines of an automobile like sparkling brightwork, and nothing is a bigger chore to care for if it begins to spot and pit, rust or peel. With Allegheny Stainless trim, the original beauty is a beauty forever, stainless clear through and as corrosion resistant in its old age as the day it came off the line. Highly formable, gleaming bright, protective and dent resistant...stainless steel.



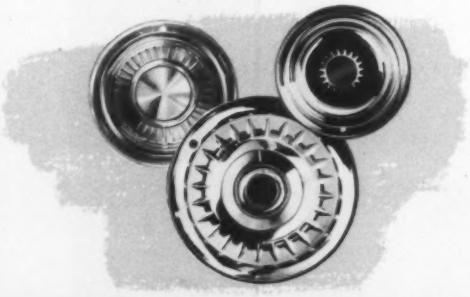
Grilles



Nothing establishes the appearance of a car as much as the "expression on its face"...its front end-grille design. And nothing has more to contribute to the beauty, prestige, and crisp styling of the grille design than stainless steel. Allegheny Stainless in bar form, tubing, strip or patterned sheet lends itself to economical fabrication techniques...roll forming, expanded metal, spot welding...all important in any fabrication with as much resultant waste as present grille forming techniques. Automotive engineers, using some of these newer processes, are re-evaluating stainless.

Hubcaps and Wheel Covers

Wheel covers and hubcaps demand a variety of metal characteristics and some are almost mutually incompatible...springiness, formability, dent resistance, brightness, corrosion resistance, scratch resistance, dimensional stability, stiffness...and more. Only one metal can come close to meeting all these requirements...stainless steel.



STAINLESS...both on and over the automotive horizon

More and more stainless steel will appear on the cars of tomorrow. Everything points to it...today's conditions require it, so will tomorrow's. There's a definite trend to longer warranty periods. Competition will probably cause these warranties to be extended, and extended yet again. Parts simply must last longer to make these warranties possible.

There's also a trend toward less owner-maintenance, such as sealed lubrication systems, sealed engine coolant and automatic air conditioning systems, self-adjusting brakes, and the like. Design features such as these will continue. Again, competition will probably force the extension of such systems, and their inevitable elaboration.

Both trends lead to increased use of Allegheny Stainless. When parts just have to stand up in warranty, the call is for stainless. And when less owner-maintenance develops, the corrosion resistance and foolproof characteristics of stainless begin to pay off. Such hidden applications as fuel tanks, floor pans, surge tanks, radiator systems, etc., are already receiving a good, hard look from engineers as future stainless applications.

Other requirements are advanced by design problems and improvements in automotive interiors. Gleaming, durable stainless steel makes a sales feature of the constant, close-up scrutiny of even the most discriminating auto passenger. It stands up under constant handling, scuffing and lack of polishing and provides the modern automotive interior with the ornamental brilliance that is uniquely stainless.

Characteristic of stainless, as well, is its remarkable ability to withstand elevated temperatures for long periods of time, and to resist corrosive environments under such conditions. As early developmental work has shown, this admirably fits it for service on the numerous anti-smog devices now vying for official recognition. With service temperatures as high as 1800 F, with lead oxide, sulfur, catalysts, and other chemical corrosion a factor, no other material can be actively considered aside from a stainless, heat-resisting steel.

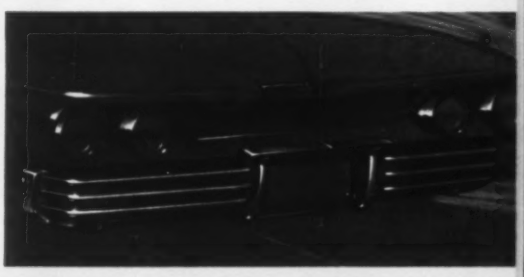
These are just a few thoughts on how Allegheny Stainless and the automotive designers will be working for motoring enjoyment...tomorrow or the next day.

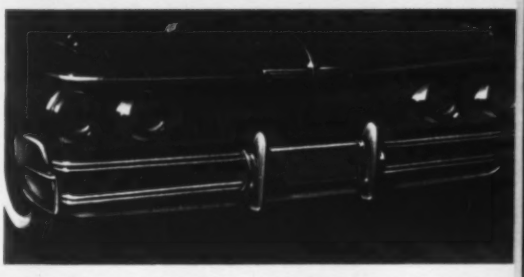
Bumpers

Possibly the most exciting design possibilities involve the front and rear of the modern automobile and the need for bumpers. Designers are faced with the task of integrating a massive section of metal into an overall design concept. Stainless steel can play a very great part in this effort, from both the esthetic and structural standpoints.

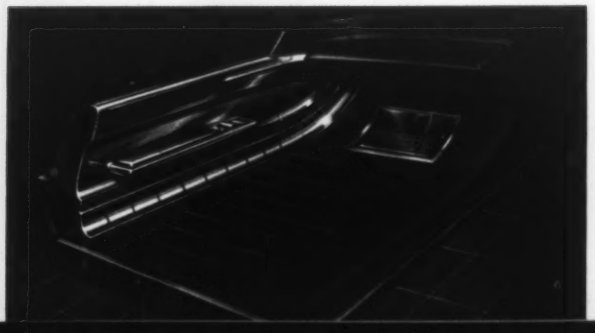
One interesting bumper technique is the fabricated bar bumper of stainless steel. Solid stainless bars offer an unmatched combination of beauty and strength, are easily formed, and may be worked into a variety of front-end designs featuring floating grilles and fabricated bumper guards. Stainless bars are repairable, by straightening, welding, buffing...all relatively simple operations.

Or, the protection and beauty of stainless steel may be obtained in a bumper with a metallurgically-bonded stainless cladding over the baser, underlying metal. Cladding offers the same exterior corrosion resistance and durable beauty as solid stainless designs. It won't scrape, peel, or rust. And, for maximum impact strength, and equal protection with lighter cross sections, some of the high strength stainless grades offer most interesting avenues for exploration.





Interiors



The hidden Value of Stainless in Automotive Design...

Ask a housewife about this strong and handsome metal ...about its useful life, its strength, its corrosion resistance. She'll be able to tell you...she lives with it daily and sees it everywhere. She knows its beauty and prestige-building appeal, its dollar-value economy.

But aside from these obvious advantages, stainless steel has hidden values for those who really know it well, an added desirability based on reasons both functional and esthetic...practical and personal.

IN DESIGN...to designers, stainless steel has a highly utilitarian character. Designers feel better about working with its honest nobility. They prefer its reliability, its mathematical predictability, its strength, the look and feel of it, and its uniquely masculine character. It's a designer's metal.

IN STYLING...to stylists, the rich luster and high prestige of stainless steel provide an irresistible creative challenge. They are intrigued by the limitless possibilities offered by its variety of textured surfaces and finishes, its ease of forming, bending, shaping. It's an expressive metal... a stylist's metal.

IN MARKETING

...salesmen and marketing men know the value of stainless in automotive design. They know a customer's reaction to it. They know the universal appeal of stainless, the built-in customer acceptance based on its unqualified success in kitchen and other home appliances, in sporting goods, jewelry, and cutlery. It helps sell. It's a salesman's metal...a marketing metal.

AL ALLEGHENY LUDLUM STEEL CORPORATION

General Headquarters: Oliver Building, Pittsburgh 22, Pa.

EVERY FORM OF STAINLESS ... EVERY HELP IN USING IT

2909-A

Litho in U.S.A.

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Punches and Dies

New-process punches, dies, rivet sets and compression-riveter dies of every shape and size are illustrated by 145 sketches in this newly-revised catalog. For quick reference, there's a handy stock list showing all the tools. (George F. Marchant Co.)

For free copy circle No. 1 on postcard

Turret Drill

A description of a numerically-controlled turret drill is found in an attractive brochure. The drill boasts precise control that boosts output and almost eliminates scrap. (Fosdick Machine Tool Co.)

For free copy circle No. 2 on postcard

Crown-Gear Grinder

An automatic gear grinder is the subject of a technical data sheet that discusses grinding-cycle options, feed rates, wheel dressing and wear. The grinder is used on spherical gear teeth, spur gears and splines. (Michigan Tool Co.)

For free copy circle No. 3 on postcard

Roll-Pass Calculator

Used like a slide rule, this roll-pass calculator figures the starting round sizes for flat wire and the number of roller passes needed to get the desired flat size. (Fenn Mfg. Co.)

For free copy circle No. 4 on postcard

Industrial Aluminum

Six new booklets examine the full range of architectural and industrial aluminum building products. They cover everything from gravel stops and copings to curtain-walls. Some of them contain color chips of available finishes. (Aluminum Co. of America)

For free copy circle No. 5 on postcard

Valves and Fittings

Well illustrated, a 464-page edition catalogs a complete line of valves and fittings. It features an enlarged metals and materials section. The engineering data section now includes pages on fluid flow. New format makes reference work easier. (Crane Co.)

For free copy circle No. 6 on postcard

Bolt for 1200°F

Four pages of technical literature details the performance of an external-wrenching bolt that's designed for high-temperature use. Curves plot stress relaxation. The folder also reviews design and processing. It lists complete size data. (Standard Pressed Steel Co.)

For free copy circle No. 7 on postcard

Hard Carbide

$E = 94x10^6$. How do you use a material 3-times as rigid as steel? The answer is contained in a pocket-size booklet that spotlights the uses of a hard-cemented carbide with this high YME (Young's Modulus Of Elasticity). It also notes properties of the carbide, such as wear resistance and dimensional stability, that are valuable to almost every industry. (Kennametal Inc.)

For free copy circle No. 8 on postcard

Gear Motors

New designs in small, low cost electric motors built for long, quiet operation in appliances, pumps, vending machines and other motorized applications are highlighted in a new four-page brochure. Com-

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41	42	43	44	45	46	47	48	49	50
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Product Manufactured .....

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Co. Address .....

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FREE LITERATURE

plete specification data are given for shaded-pole induction motors, and new models in helical, spur and worm gearmotors. Description includes photographs, speed ranges, torques, size, gear descriptions, optional features such as brake, clutch and socket output shaft. (Brevel Products Corp.)

For free copy circle No. 9 on postcard

Aluminum Forgings

In 20 pages, a booklet reviews the production of all types of aluminum forgings; including precision, no-draft, blocker-type, hand and impact as well as rolled rings and forged fittings. Other sections concern design, quality control, typical uses and metallurgical data. (Harvey Aluminum)

For free copy circle No. 10 on postcard

Film Cutter

Details on a heavy duty, precision-built, knife cutter, expressly designed for granulating thin film sheets up to 48 in. wide, are shown in a 2-page data sheet. (Sprout Waldron & Co.)

For free copy circle No. 11 on postcard

Containers

Condensed specifications, special features, construction details on various types of palletainers are covered in a 4-page brochure. (Union Steel Products Co.)

For free copy circle No. 12 on postcard

Chemical Pumps

A new four-page bulletin describes the features of a new chemical pump. These include automatic thrust balance, extremely large bearings, and oil filled stator cavity. The bulletin also includes comperformance curves and a detailed cross-section of a new line of canned pumps. (Chempump Div., Fostoria Corp.)

For free copy circle No. 13 on postcard

Acid Cleaner

Powdered acid cleaner for use in cleaning scale deposits from boilers, heat exchangers, water lines, pumps and other equipment is the subject of a new four page bulletin. The acid cleaner is a free-flowing mixture of a solid acid, corrosion inhibitor and antifoam. The active inhibitor makes the cleaner safe for use in systems containing iron, steel, copper, copper alloys, brass and aluminum. (Hagan Chemicals & Controls, Inc.)

For free copy circle No. 14 on postcard

Roll-Formed Shapes

A roll-forming technique for Vinyl-clad metals is highlighted in an illustrated brochure. It shows more than 200 representative cross-sections of available shapes in actual size. (Roll Formed Products Co.)

For free copy circle No. 15 on postcard

Computer System

"New Solutions in the Science of Simulation," a 20-page, illustrated brochure offers details in the latest advances in computer technology and equipment. Includes a report on a computer which synthesizes the analog computer's speed. (Systems Inc.)

For free copy circle No. 16 on postcard

Oxygen Sensor

A polarographic oxygen sensor can be used in application where potential toxicity exists. The sensor weighs two and a half ounces and is 1½ by two in. (Beckman Instruments, Inc.)

For free copy circle No. 17 on postcard

Drill Grinder

A new four page bulletin describes the features and operations of a drill grinder. The self contained dry grinder has a maximum capacity for 2 and 4 lip drills up to 3 in. diameter and for 3 lip drills up to 2-9/16 in. diameter. (Farrel-Birmingham Co.)

For free copy circle No. 18 on postcard

Power Grip

Means for automatically feeding round, square or hex bar stock or tubing to lathes or screw machines by low pressure are displayed in a two page data sheet. This sheet describes a system which grips and feeds stock to be machined for any desired length. (Power Grip Inc.)

For free copy circle No. 19 on postcard

Compact Weigh-feeder

The subject of an illustrated bulletin is a precision weigh-feeder for small-capacity, injection-molding machines. The unit is compact and easily installed. It automatically weighs and delivers plastic charges to the press in exact quantities. (The Exact Weight Scale Co.)

For free copy circle No. 20 on postcard

NEW PATENTS

Holds Molten Metals

Holding apparatus for molten metals, W. Goetz and E. Buhrer (assigned to Georg Fischer A.G., Schaffhausen, Switzerland), Nov. 29, 1960. A design of a mixer which regulates the analysis and temperature of molten iron during treatment. The molten iron is delivered to molds at a predetermined constant temperature with a uniform analysis throughout the period of foundry operation. No. 2,962,-278.

Handles Repair Piece

Device for handling a furnace-repair piece, J. V. Salmi (assigned to U. S. Steel Corp.), Jan. 31, 1961. A design for a device that inserts a repair piece behind the buckstays of an open-hearth furnace. U. S. 2,969,884.

Alloy Steel

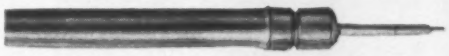
An alloy steel having surface free from alligatoring, C. G. Mickelson and C. D. Asherman (assigned to American Steel Foundries), Feb. 7, 1961. An alloy steel for making castings with high impact strengths and smooth surfaces consists of 0.25-0.5 pct C, up to about 0.025 pct each of P and S, 0.75-3 pct Cr, 1.5-2.5 pct Mn, 0.75-3.5 pct Ni, 0.5-0.65 pct Mo, 0.0005-0.005 pct B, at least 0.6 pct Si, at least 0.1 pct Al, at least 0.35 pct rare earths, and the remainder essentially all Fe. U. S. 2,970,903.

Reduces Fume

Treatment of ferrous metal, T. C. Churcher (assigned to The British Oxygen Co. Ltd.), Jan. 24, 1961. In a method for reducing the fume leaving the reaction space in a ferrous-treatment tower, the subdivided molten metal contacts a stream of oxidizing gas. The injector action of the gas is used to withdraw at least part of the fume. U. S. 2,969,282.

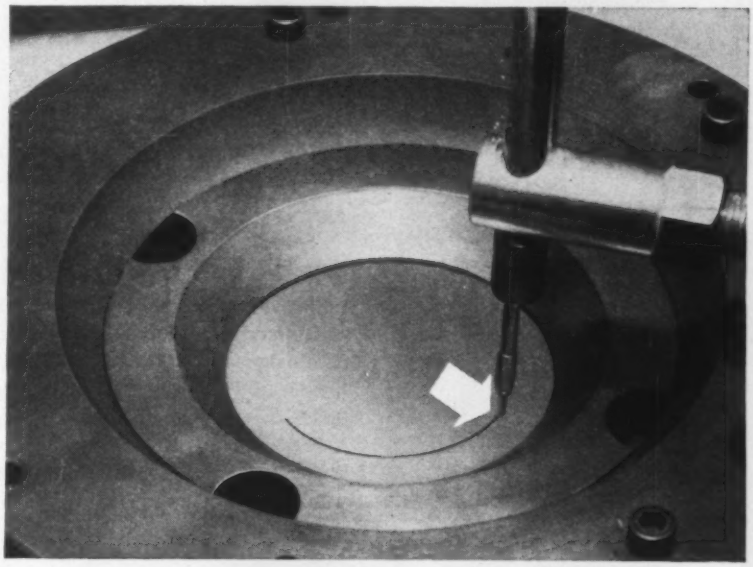
Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

Another "impossible" job done by the Airbrasive...



...cutting tungsten

abrading • cutting • deburring • stripping • drilling • cleaning • scribing



Comstock & Wescott found: "The most practical way to cut tungsten sheet without cracking!"

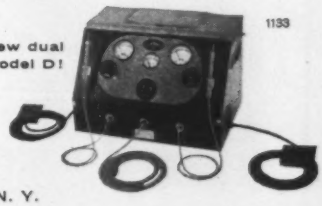
Here was a tricky job for the Airbrasive. Comstock & Wescott, Inc., Development and Research Engineers, Cambridge, Massachusetts, had to cut 0.005" thick tungsten sheet into circular components for missile systems. Mechanical cutting methods caused the brittle tungsten parts to crack. *The Airbrasive did it successfully!*

How does the Airbrasive work? It obtains its precise cutting action from a high-speed jet of dry gas and abrasive particles that quickly cuts, slices or abrades, as needed, almost any hard brittle material... germanium, silicon, glass, alloy steels, ferrites, mica, ceramics and others.

Important too... the cost is low. For under $1000.00 you can set up your own Airbrasive cutting unit!

Send us samples of your "impossible" jobs and we will test them for you at no cost.

SEND FOR BULLETIN 6006
... complete information.



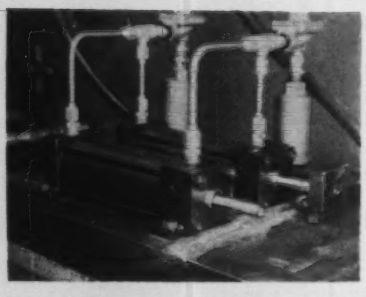
S. S. White Industrial Division
Dept. 32A, 10 East 40th Street, New York 16, N. Y.

New Materials and Components

Sleeve Bearing Runs on a Hydrodynamic Oil Film

With a warranted life of five years, these pillow blocks generate a hydrodynamic oil film between a sintered-bronze bushing and a hardened-steel rotating sleeve. They capitalize on the tendency of sintered bronze to cold flow and compact when loaded, becoming a solid impervious material under the load. The balance of the bushing remains porous. This permits an oil flow which maintains the oil film. A special process gives boundary lubrication to the bearing area to prevent seizure before the bronze compacts in the area under the load. (Tann Corp.)

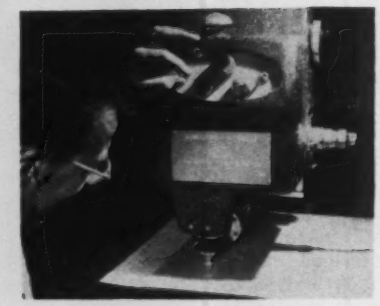
For more data circle No. 21 on postcard, p. 131



Stud-End Piston Rods Endure Severe Side Loads

Proving 40 times more resistant to fatigue failure than normal ⅝-in. diam cylinder rods, a new-type piston rod utilizes stud ends. It's able to withstand high speeds and severe side loads. This means reduced costs and machine downtime caused by cylinder failure. Why? Studded rods get rid of stress concentrations which form at thread reliefs in conventional rod designs. These stresses are critical when cylinder and work are misaligned, and they're a common cause of failure. (Hydro-Line Mfg. Co.)

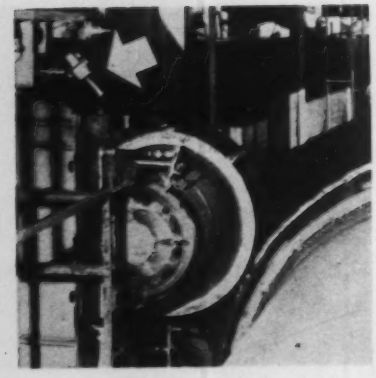
For more data circle No. 22 on postcard, p. 131



Electronic Tracer Follows Drafted Templates

Mounting on the cutting-machine operating bar, an electronic tracer gives the desired torch motion during cutting. The unit uses templates prepared by normal drafting methods. This reduces the cost of templates and finished work. It has several parts; a scanning head and control, control-panel mounting bracket and a raise-lower device. The last comes in two types; manual or electric. A light-sensitive device in the scanning head follows the template line of the part. It's not affected by extraneous light but the line width must be 0.020-0.040 in. (Air Reduction Sales Co.)

For more data circle No. 23 on postcard, p. 131



Pyrometer Scans and Records Kiln Temperatures

An easily-installed, pivoting-pyrometer system, that constantly scans and records shell temperatures of a rotary kiln, also signals an alarm before any potential hot-spot becomes dangerous. It points out the location, and shows the rate of change of the hot-spot temperature. This prompt warning lets the operator correct the trouble without shutting down production. The unit bolts to any nearby surface; beneath, beside or above the kiln. It has its own drive unit and doesn't need an external traversing mechanism or structural support. The special span of the system, from 200-1000°F allows it to record normal operating temperatures as well as hot-spots. Thus it is also valuable for process studies. (Leeds & Northrup Co.)

For more data circle No. 24 on postcard, p. 131

NEWCO
Oil Tempered

SPRING WIRE

is
available
in all grades
and is
consistently
uniform
from coil
to coil.

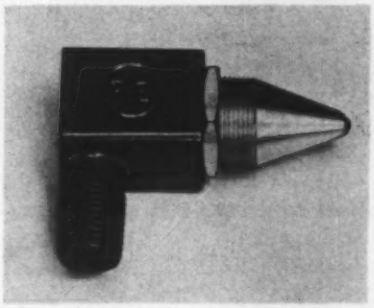
NEW ENGLAND HIGH CARBON WIRE CORP.

MILLBURY, MASSACHUSETTS

Offices and warehouses: Cleveland, Detroit, Los Angeles, Melrose Park (Chicago) and Millbury

Scans Small Objects

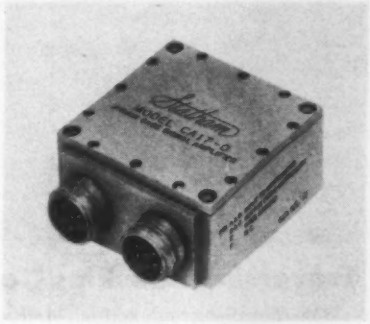
Consisting of lens holder and tunnel aperture, a pinpoint optical system adapts photoelectric scanners to tiny parts and movements. It greatly increases the scanner's ability to detect small objects and movements. When used on the photocell, the system gives a narrow field of vision good for small objects up to 10 ft away and movements of slow objects near the photocell as low as 0.001 in. When used on the light source, it produces a small, well-defined spot of light. This allows the scanner to detect objects of only 0.001-in. diam or even to follow lines in tracing. (Farmer Electric Products Co., Inc.)



For more data circle No. 25 on postcard, p. 131

Tiny Signal Amplifier

Only 4 cu in. and 4¼ oz, this new signal amplifier gives total utilization of low-level signals. It's reliable in adverse environments. Potentiometers permit zero and sensitivity adjustments. The signal output is isolated from the power-supply unit. With a power requirement of 35 milliamperes, the amplifier's output is −0.5 to +5-v dc. (Statham Instruments, Inc.)



For more data circle No. 26 on postcard, p. 131

THE
FREEDOM
DI
MEN
SION

. . . stretches your design potential

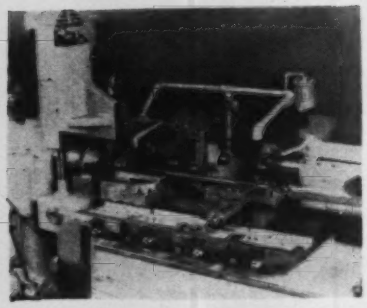
Parts-design becomes as flexible as wax when you specify investment casting. With the "lost wax" process, parts may be designed for function...operating efficiency . . . and wearability. Costly machining and assembly operations are reduced and often eliminated. A wide variety of alloys offers better parts performance and cost reductions.

To discover the benefits Hitchiner Investment Casting can bring you...

write for complete technical and facilities information.

HITCHINER
Milford 4, New Hampshire

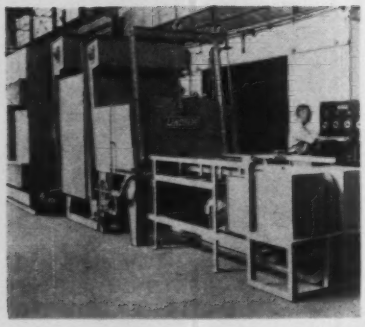
New Equipment and Machinery



Turning Lathe Roughs And Finishes Axle Shafts

Effectively combining all rough and finish operations on one machine spells savings to the manufacturer. Special tooling made this possible for an axle-shaft producer. The operation consists of taking two cuts on the flange faces and, at the same time, burnishing an oil-seal diameter. Mounting enough tooling on one machine was the basic problem. Equipping a lathe with a 4-slide carriage, two back-squaring units, a vertical-facing unit, tailstock-turning attachment and an auxiliary front-turning fixture solved it. All operations are fully automatic. (Seneca Falls Machine Co.)

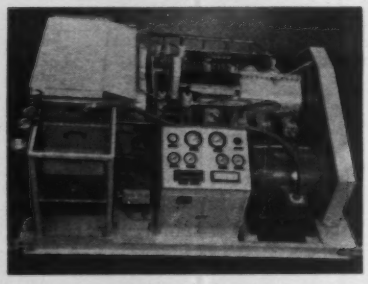
For more data circle No. 31 on postcard, p. 131



Heat-Treating Furnace Cycles Automatically

Capable of 2100°F, a full-muffle, hydrogen - atmosphere furnace for bright heat treating missile and stainless steels also brazes stainless. It's electrically heated and has an accelerated atmosphere quench. Operation is automatic. Once the sequence timers are set, the operator merely presses a button to send the work through the purging, heating and cooling cycles. Another feature is a cylindrical muffle with complete atmosphere lock ahead of the cooling section. There's also a built-in heat exchanger in the atmosphere-quench chamber. Special snake-chain units load and unload the charge from the chambers. (Lindberg Engineering Co.)

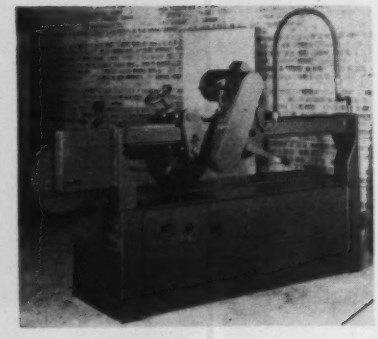
For more data circle No. 32 on postcard, p. 131



Compression System Delivers Pure Gases

As the central high-pressure source, this compression system meets the broad needs of component testing and general industry for high-pressure pneumatics. It qualifies as ground-support equipment for the ICBM program. Capacity is 150 scfm at 128 psig intake, using a 4-stage, 8-cylinder compressor. It guarantees a gas supply at 3500- to 12,000-psi continuous discharge pressure, with less than 1-ppm oil content and a dewpoint of −100°F. Maintenance is easy. (Marmon-Herrington Co,. Inc.)

For more data circle No. 33 on postcard, p. 131



Traversing Saw Rips Carbon and Stainless Steel

The basic cutting action of the saw depends on a tooth shape which gives a semi-milling effect. The blade moves through stock so fast that it absorbs no heat. This means burr-free cuts without drag or coolant. Sawing pressure alone holds the stock. Clamping isn't necessary. The head is fed by a geared hand wheel and travels on eight precision rollers for good stability. Cutting times range from 12 seconds for through-cut on 12-in., 31.8# I-beam down to 1½ seconds on 2-in. diam, ¼-in. wall, SA-106-B pipe. Up to 800 cuts are made before resharpening is necessary. (Production Machinery, Inc.)

For more data circle No. 34 on postcard, p. 131

Pittsburgh's Four Gateway Center is one of the most dramatic architectural uses of stainless steel in the world today. Even more dramatic to the architect, builder and owner is the remarkably low $7.50 per sq. ft. erected cost of the stainless steel curtain wall.

Washington Steel's gray ColorRold provided the means for accenting the vertical lines that make this edifice one of the most talked about buildings of our era.

4 Gateway Center, Pittsburgh
Harrison & Abramovitz, *Architects*
Limbach Co.,
Curtain Wall Contractor

WASHINGTON STEEL CORPORATION

and ColorRold®

PRODUCERS OF *MicroRold®* STAINLESS SHEET & STRIP

WASHINGTON, PA.

STRAIGHTEN, SIZE, COIN

WARPED
MALLEABLE IRON CASTINGS
in one operation on the

CECOSTAMP

Save in manufacturing costs
Restrike to close tolerances
Reduce number of rejects
Improve inspection methods

The Cecostamp's impact blow not only straightens, but can also coin to close tolerances • 100% restrike in the Cecostamp makes it unnecessary to inspect and size castings manually, piece by piece • No longer is it necessary to laboriously stack castings in annealing baskets to minimize distortion • In many cases, close tolerance restrike reduces casting weight and minimizes machining operations • The Cecostamp is an air-powered Drop Stamp; rapid, safe, easily operated • Dies are simple, inexpensive • Applications often displace larger, more expensive presses • Write for complete details.

CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PA.

CHAMBERSBURG

• The Hammer Builders •

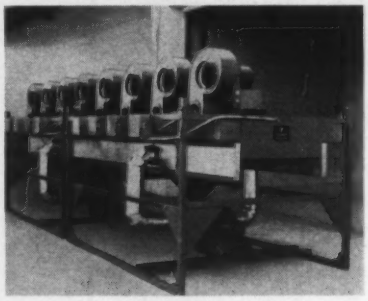
DESIGNERS AND MANUFACTURERS OF THE IMPACTER

When it's a vital part, design it to be FORGED

NEW EQUIPMENT

Electric Ovens

Using quartz lamps as heat sources, a new series of modular electric-infrared ovens operate at temperatures up to 1200°F. They can be assembled in any practical length and any necessary width. Each heating bank consists of 5 steel-framed modular sections. Oven

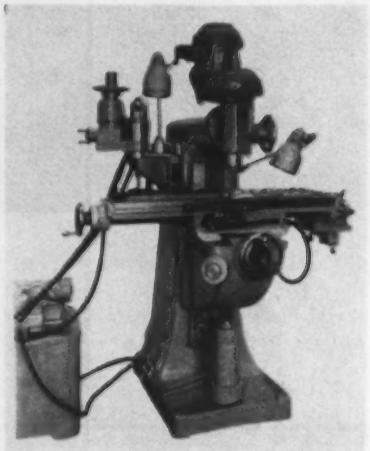


hearths are free-floating types. Every hearth is filled with insulation to shield the underside. All sections boast light weight and mobility. They can be moved to suit revised plant layouts or changes in production needs. (Radcor, Inc.)

For more data circle No. 35 on postcard, p. 131

Vertical Mills

Special vertical milling machines for hydraulic duplicating are available with table sizes ranging from 10 x 36 in. to 10 x 54 in. Extra



rigidity is insured by raising and lowering the knee to follow the contours of a "master" rather than by actuating a quill. Heavy knee cylin-

Irus 902 is bright yellow—helps you spot leaks quickly.

BULLETIN:

Shell reveals how Irus 902, the bright yellow hydraulic fluid, holds water in oil to reduce fire danger in your plant

Shell forced Irus® 902 Hydraulic Fluid through a 0.145-inch orifice at 1000 psi pressure. A 3000-degree flame was thrust into the streaming fluid. Irus 902 did not ignite.

Read the remarkable story of Irus 902—why it resists fire—and how it can help you protect personnel, plant and equipment.

IRUS 902 Hydraulic Fluid is an ingenious combination of oil and water. The water is encased in a film of oil. In technical terms, it is a stable water-in-oil emulsion.

> *But unlike other emulsions, Irus 902 has optimum stability. This is vitally important. It means that Irus Fluid will retain its lubricating qualities far longer than most fire-resistant oils—and will not allow the water to separate out.*

Result: the water stays in the oil, ready to snuff a fire if needed.

Other Advantages

1. *Irus 902 cools off systems.* Because of its high rate of heat transfer and high heat capacity, Irus 902 allows hydraulic systems to run cooler.

2. *Irus 902 resists thickening and thinning.* Viscosity of Irus 902 protects pump parts during the entire working cycle—from cold start-up to hot, continuous operation.

3. *Irus 902 saves gaskets, packing, hose.* It's gentle to nonmetallic parts as well as metal.

4. *Irus 902 resists foaming.* It does not hold captive air. If air enters, Irus 902 quickly releases it.

For complete details about changing over to Shell Irus 902, contact your nearest Shell Industrial Products Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, N.Y.

A special message to manufacturers of hydraulic equipment

Shell Irus 902 makes an excellent initial fill. It is available anywhere in the U.S.A. Its quality is consistently high. All Irus 902 must meet Shell's strict quality control specifications.

SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are working to provide better products for industry.

Job Report Courtesy of
Leader Iron Works, Inc., Decatur, Ill.

For peace of mind
on any stainless welding job

This vacuum separator, made of 5/16" Type 316 stainless steel, is designed for 100 psi test pressure. To assure *predictable* results, Arcos Chromend KMo Electrodes (Type 316) were selected for a *combination* of top physical, metallurgical and chemical properties. For maximum benefits in welding stainless—consistent quality, low cost weld metal, and reliability in service —you can count on ARCOS.

WELD WITH ARCOS

STAINLESS ELECTRODES

for quality weld metal

ELECTRODES • WIRE • FLUXES
SEMI-AUTOMATIC AND AUTOMATIC EQUIPMENT FOR WELDING
STAINLESS • LOW ALLOY • ALUMINUM • MILD STEEL

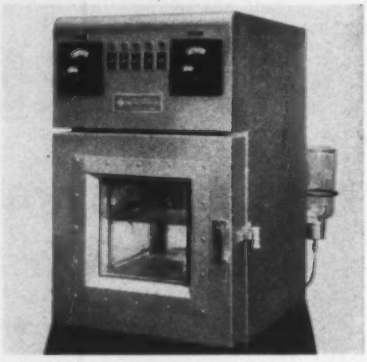
ARCOS CORPORATION • 1500 South 50th St., Philadelphia 43, Pa.

ders take the place of conventional vertical-feed screws. However, manual vertical knee feeds have been retained to facilitate setups. (U. S. Burke Machine Tool Co.)

For more data circle No. 36 on postcard, p. 131

Test Chamber

For environmental testing, this new chamber controls temperature and humidity. Temperature range is −100° to +400°F; humidity 20-95 pct. It's available in 2-, 4-, and 8-cu ft sizes. Wet- and dry-bulb indicating controllers regulate temperature and humidity conditions. An 8-in. air circulator, with fin coil evaporator, insures even tempera-



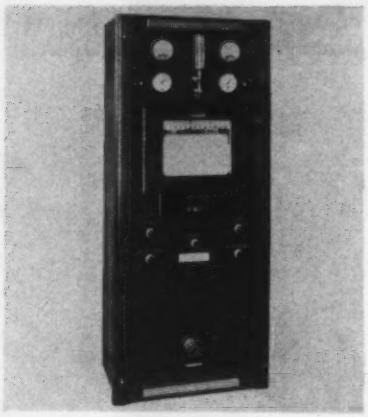
ture. The door hinges right or left and has 12 x 12-in., frost-free, multipane window. Other optional features include terminals, ports and programming controllers. (Cincinnati Sub-Zero Products)

For more data circle No. 37 on postcard, p. 131

Controls Carbon

A carbon-potential controller senses and controls the carbon potential in endothermic atmospheres used in the treatment of iron-base alloys. For example, in the treatment of 0.40-carbon steel, this same 0.40-carbon level must be held in the work-chamber atmosphere to prevent either the addition or depletion of carbon at the work surface. The generator may deliver a furnace atmosphere for an equilibrium condition; however, at the furnace operating temperature, the carbon level could be wrong. With

this instrument, you simply set the desired control point. It senses the unbalance, proportions the addi-

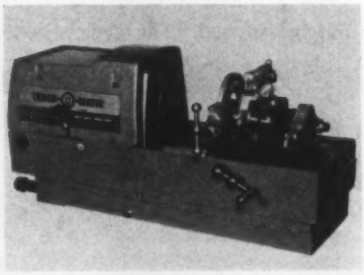


tives and restores the equilibrium condition with the desired carbon level. (Rolock Inc.)

For more data circle No. 38 on postcard, p. 131

Portable Threader

Some people like to ream, thread and cut. Others prefer the reverse order. With a new precision threader you can do either. Just interchange the cutter as you wish. Or, with a special head, thread and ream simultaneously. The machine features a special double chuck. It automatically grips and centers the pipe. Turn the switch off and the



pipe's released. Fast make-on is another advantage. The unit threads pipe and conduit up to 2-in. diam; bolts with up to 2½-in. diam. An optional stand makes the unit portable. (Collins Machinery Corp.)

For more data circle No. 39 on postcard, p. 131

Single-Phase Welder

Offered in 300-, 400-, and 500-amp sizes, this recently introduced welder has versatility and modest price. It features continuous cur-

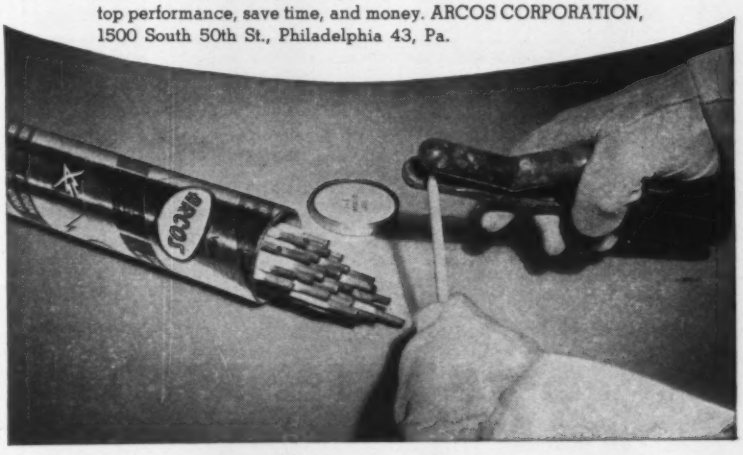
Job Report Courtesy of
Southwest Welding & Mfg. Division,
Yuba Consolidated Industries, Inc., Alhambra, Calif.

When strong welds are needed to resist impact at minus 320°F

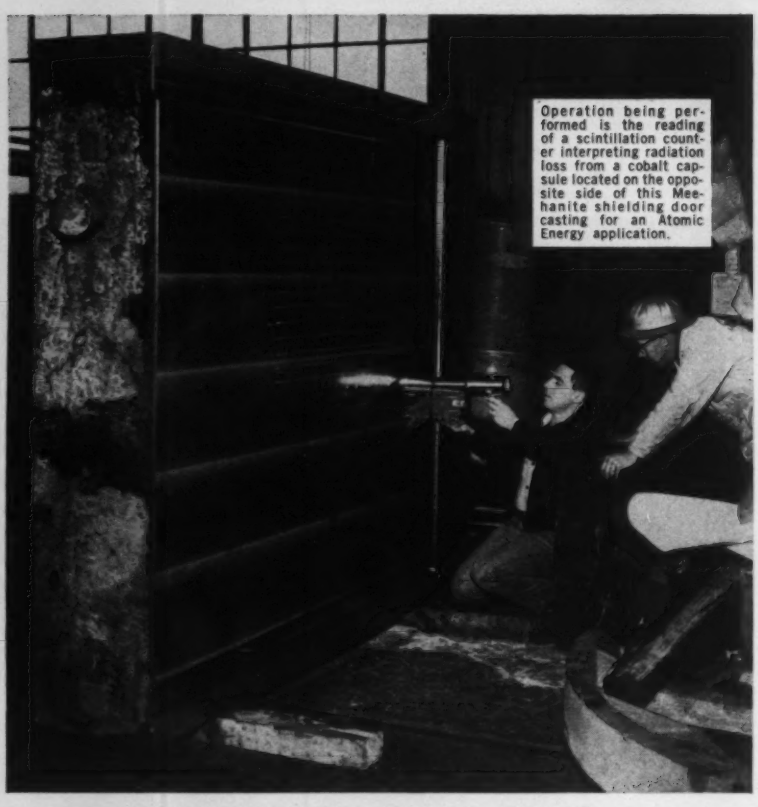
WELD WITH ARCOS

STAINLESS ELECTRODES

This six-section spherical liquid oxygen container is made of Type 321 stainless steel. Walls 4½" thick were required to withstand 3000 psi pressure. To assure crack-free welds to meet ASME impact properties at −320°F, it was welded with Arcos Chromend 19/9Cb-LC electrodes with controlled ferrite. The first time—and every time you use Arcos electrodes—you get top performance, save time, and money. ARCOS CORPORATION, 1500 South 50th St., Philadelphia 43, Pa.



MEEHANITE® MEANS BETTER CASTINGS


Operation being performed is the reading of a scintillation counter interpreting radiation loss from a cobalt capsule located on the opposite side of this Meehanite shielding door casting for an Atomic Energy application.

Specify Meehanite® For High Density And Solidity In Heavy Sections

Dimensions of the 85,000 lb. Meehanite casting above are 12'6" x 12'6" x 12" thick. Specific gravity tests, ultrasonic and radiation loss readings verify its uniform and controlled density.

In massive castings of this type which have a slow cooling rate, there is a natural tendency towards a more open structure with a corresponding loss in strength. However, in Meehanite castings the effect of "mass influence" is minimized through the use of constitutional carbide controls which are exclusive to the Meehanite Process. Breakdown of structure due to slow cooling is avoided by providing a definite degree of undercooling of the graphite to the melt.

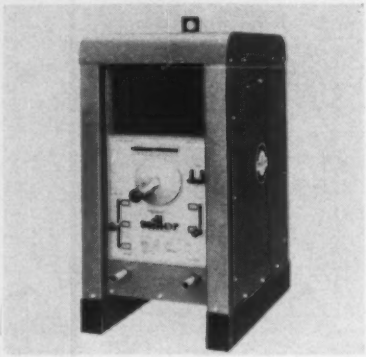
In specifying the correct type of Meehanite metal for castings with very heavy or very light sections, the effect of mass influence should always be considered.

For detailed information, send for a free copy of bulletin TD-14-EFFECT OF MASS INFLUENCE. Write: Meehanite Metal Corp., New Rochelle, N.Y.

MEEHANITE METAL

Meehanite Castings Are Made Only By Meehanite Foundries

rent control, an open circuit of 80 v in both ac and dc with two wide welding currents in each. Forced-

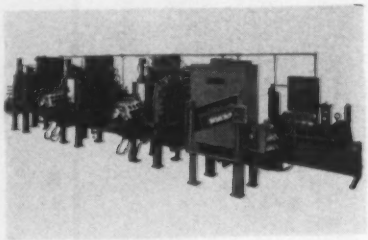


draft ventilation, dead-front construction and sturdy drip-proof cabinets are additional advantages. (Miller Electric Mfg. Co.)

For more data circle No. 40 on postcard, p. 131

Stops Leaky Castings

An impregnating machine adapts to any part needing porosity sealing of water jacket, oil gallery and the like. This is done by setting the part in the fixture where it's hydraulically clamped. The fixture's tipped to 90° and locked in place. Then the cavity is sealed and the impregnating solution's pumped-in and pressurized. The cycle's com-

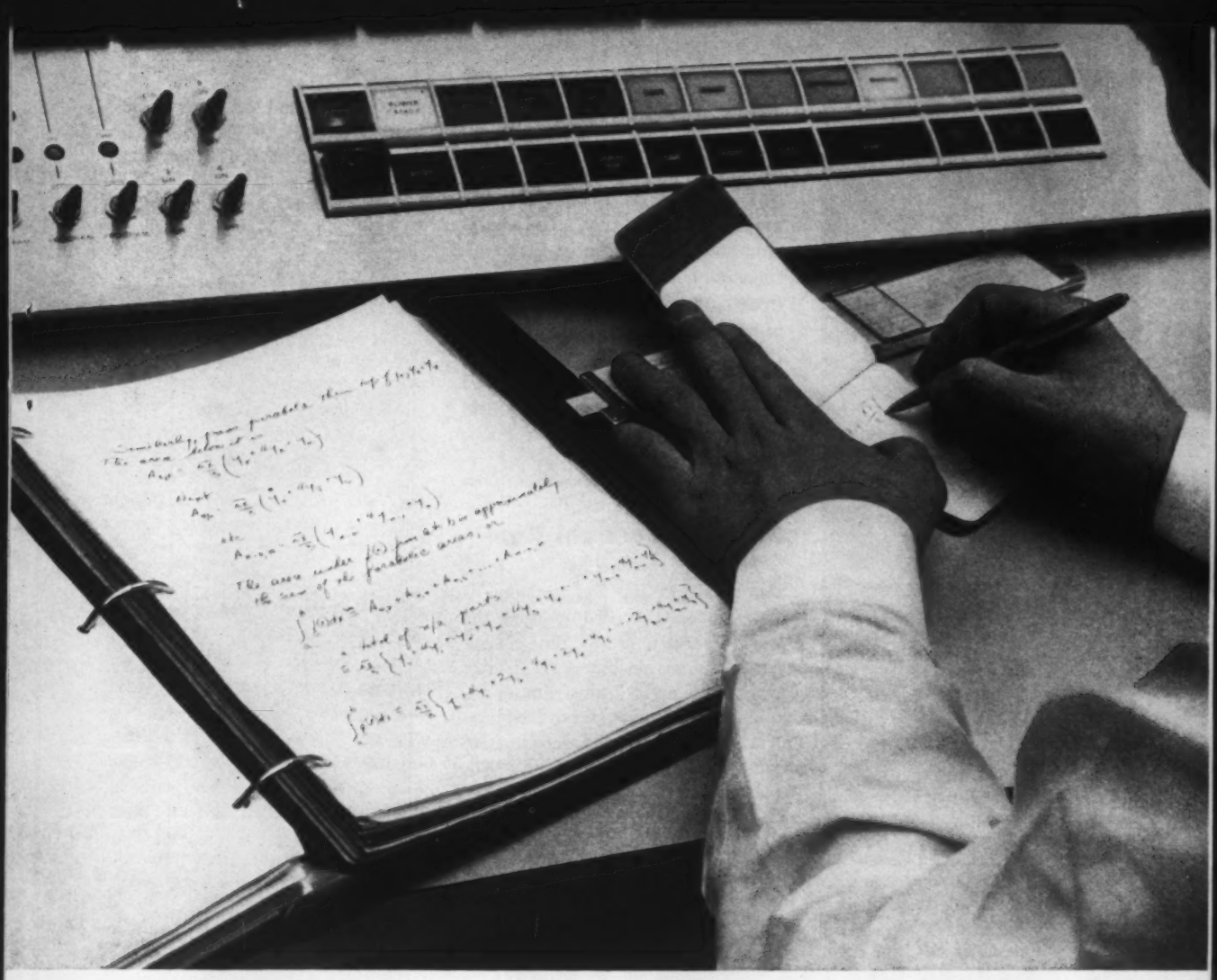


pleted by removing the solution, flushing the cavity and taking out the part. The machine includes its own solution, tank, water tank and hydraulic power unit. (Turner Bros., Inc.)

For more data circle No. 41 on postcard, p. 131

Soak-Tank Cleaner

For the removal of soils by immersion, a new material has a pH of 13.5 in the recommended solution concentration. No rosin or soap



Free engineers for creative assignments with the new low-cost IBM 1620

The IBM 1620 Data Processing System is a low-cost solution to the problem of freeing engineers for their most creative and profitable assignments. Here's why:

EASY TO USE—Just a two-day training class is all you need to put your 1620 into operation. This means no delays in learning to use the 1620 computer.

In addition, you get a wide range of free programming services including FORTRAN and GOTRAN. FORTRAN is the powerful scientific language that lets you solve problems without writing detailed computer instructions. GOTRAN is a simplified language (a sub-set of FORTRAN) that lets you enter simplified problem statements and data into the computer with the solution immediately available, in one simple operation.

FAST—The 1620 solves a set of ten simultaneous equations in only 20 seconds. It inverts a 10 x 10 matrix in just 42 seconds.

POWERFUL—The 1620 inverts a 40 x 40 matrix. With optional additional core storage the 1620 can handle matrix inversion problems of a much higher magnitude.

GET FULL DETAILS—The 1620 is the most outstanding engineering and scientific computer in its price range. A basic installation rents for just $1,600 a month.

To learn how the 1620 can free you for more creative engineering work, call your local IBM representative.

IBM's 1620 is a compact desk-size computer.

IBM®
DATA PROCESSING

product defects

getting you down?

buck up . . .

x- or gamma radiography
can find internal defects

magnetic particle or dye penetrant inspection
can find hidden cracks

bright-image fluoroscopy
lets you see "innards"

let us test for your best bet
at our Industrial Applications Lab

call any local Picker office
where a technical expert is always near
(see 'phone book) or write

Picker x-ray

25 So. Broadway, White Plains, N.Y.

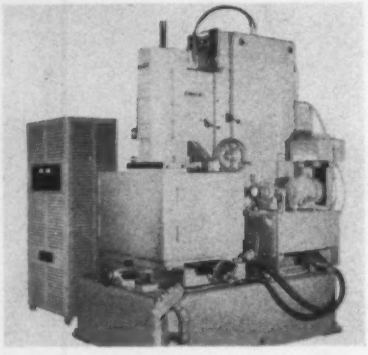
NEW EQUIPMENT

content means it's completely rinsable. It's safe on steel, brass and magnesium; but not for aluminum and zinc. For most soak-tank cleaning, good concentrations range from 4-12 oz per gal and temperatures from 180-195 F. For barrel cleaning and vitreous-enameling preparation, it's 8 oz per gal at 180 F. The cleaner does a good job in hard-water areas. (Oakite Products, Inc.)

For more data circle No. 42 on postcard, p. 131

Massive Vertical Ram

Precision machining of large stamping, piercing and trim dies is now standard procedure with the world's largest, production, electrical-discharge, machine tool. It takes work loads up to 2 tons with an automated, hydraulic, servo-feed system. The heavily-ribbed base contains the coolant reservoir. The machine comes with pumps, table, filter system and hold-down jackscrews. Even with its great mass, precision movement guarantees the

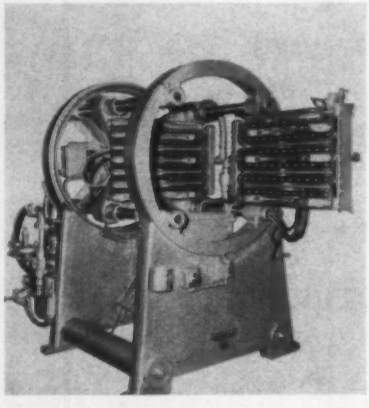


user die clearance and alignment accuracy of 0.0001 in. (Elox Corp.)

For more data circle No. 43 on postcard, p. 131

Shell-Core Blower

Preset timers on a semi-automatic shell-core blower insure consistent quality. An integral sand hopper holds 150 lb of sand. Occupying only 8 x 8 ft, the machine offers either gas or electric core-box heating. Auxiliary attachments include: Automatic sand feed, internal gas hot-air cure, top- and side-draw attachments and mechanical ejection. (Shalco Div., The National Acme Co.)

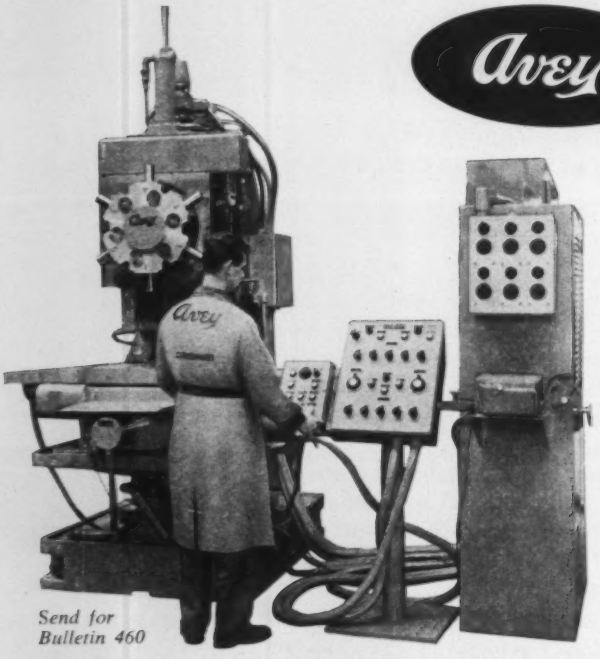


For more data circle No. 44 on postcard, p. 131

Vacuum Feeder

A vacuum feeder lifts metal sheets from a stack and feeds them vertically to punch-press or other operations. The unit has a ¾-hp motor and variable-speed drive. A complete vacuum system has ½-hp vacuum pump. Vacuum cups lift a sheet from the stack. An auto-

6 precision spindles by Avey



Send for Bulletin 460

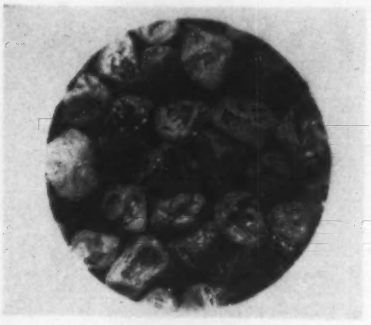
You can get this rugged Avey 250 Turret-Dex with either automatic or numerical controls. Rotary, 2- or 3-axis positioning. Pre-selected speeds, feeds, rapid advance, tapping cycles. Automatic depth control all spindles; automatic turret clamp; positive spindle stop; skip index. Capacity to 1¼". Eight spindles optional. Avey, Box 1264, Cincinnati 1, Ohio.

matic raising arm turns the sheet to vertical position against powered, magnetic feeder rolls. These rolls hold the sheet in vertical position while feeding. (The Union Tool Corp.)

For more data circle No. 45 on postcard, p. 131

Natural Diamond Grit

Unlike other grits, a new diamond abrasive is quality pre-tested by its production method. Extreme pressures, under precise control, break the diamonds into sound, blocky grits. Flats and internally-stressed pieces are subjected to repeated pressure until only sturdy grains remain. Because of their



uniform shape, close grading is possible. They're particularly good for heavy cutting or where grinding pressures are high. (Diamond Tool Research Co., Inc.)

For more data circle No. 46 on postcard, p. 131

Bends Steel Joists

With a 5-hp motor, a bending machine drives under full power both clockwise and counter clock-

wise. It's operated by one hydraulic foot valve. This permits the operator to use both hands to position the work prior to bending. After the degree of bend is set, it remains constant for repetitive bending. (Wallace Supplies Mfg. Co.)

For more data circle No. 47 on postcard, p. 131

Laboratory Separator

The separation of predominatingly ferromagnetic mixtures is the purpose of a laboratory separator. The mixture is fed down a vibrating covered chute. An alternating magnetic field is then used. This gives the mixture a certain amount of fluidity. Several times in each second, the magnetic field is switched off for a few cycles. Consequently, the magnetic and nonmagnetic particles constantly shake loose from each other. (S. G. Frantz Co., Inc.)

For more data circle No. 48 on postcard, p. 131

Stepless Wire Tester

High-speed, precision testing of wire and other specimens results when this automatic wire tester is

product defects

getting you down?

let us help you . . .

✓ find hidden cracks with magnetic particle or dye penetrant inspection equipment

✓ find deep-lying defects with x-ray or gamma radiography equipment

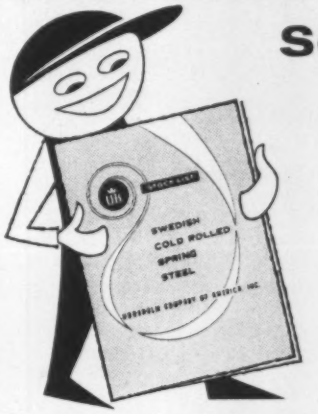
✓ see "innards" directly with bright-image fluoroscopes

✓ work out the method at our Industrial Applications Lab

call any local Picker office where a technical expert is always near (see 'phone book) or write

Picker x-ray

25 So. Broadway, White Plains, N.Y.



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Catalog-

Stocklist

This 44-page booklet provides full information on all grades and sizes of fine UDDEHOLM SWEDISH Specialty Spring Steels. They are produced in our Swedish Mills, from high-purity iron ores. The excellent flatness, uniformity and close thickness tolerances of UDDEHOLM Spring Steels will give you a better product at less cost.

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Spring Steels

. . . in different grades, tempers and finishes are some of the types stocked in our modern warehouses. Sizes range from .001" to .125" thick, ⅛" to 16¼" wide. Slitting and edging facilities are also available.

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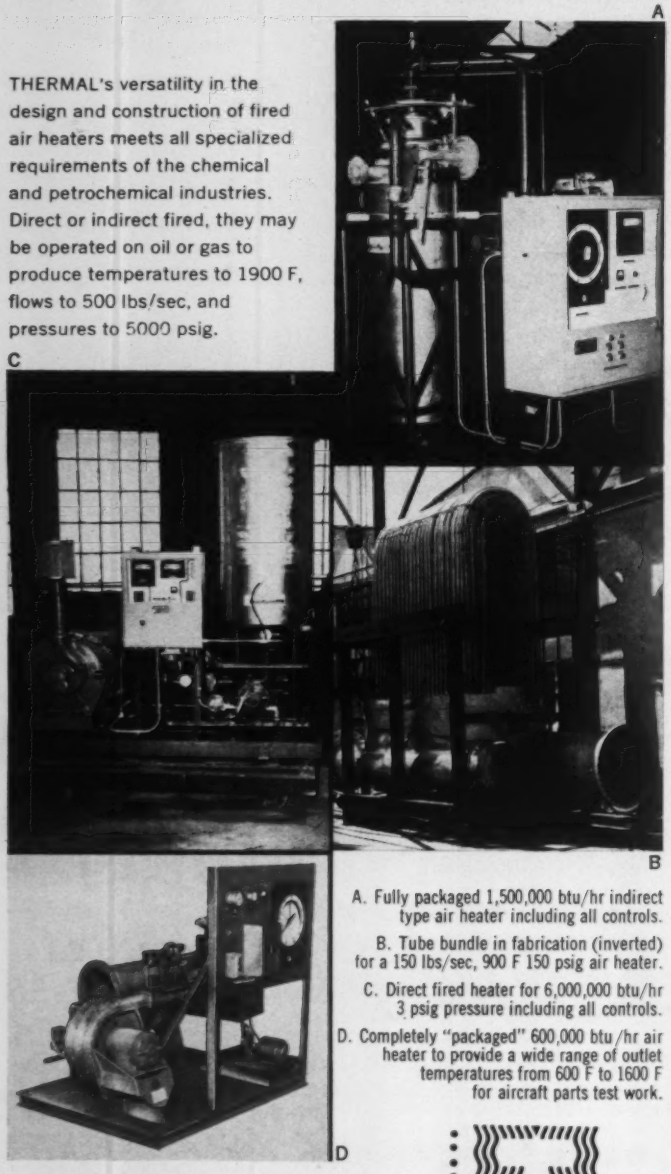
THERMAL's versatility in the design and construction of fired air heaters meets all specialized requirements of the chemical and petrochemical industries. Direct or indirect fired, they may be operated on oil or gas to produce temperatures to 1900 F, flows to 500 lbs/sec, and pressures to 5000 psig.



A. Fully packaged 1,500,000 btu/hr indirect type air heater including all controls.

B. Tube bundle in fabrication (inverted) for a 150 lbs/sec, 900 F 150 psig air heater.

C. Direct fired heater for 6,000,000 btu/hr 3 psig pressure including all controls.

D. Completely "packaged" 600,000 btu/hr air heater to provide a wide range of outlet temperatures from 600 F to 1600 F for aircraft parts test work.

For further information write for Bulletin 113 (indirect fired) • 112 (direct fired)

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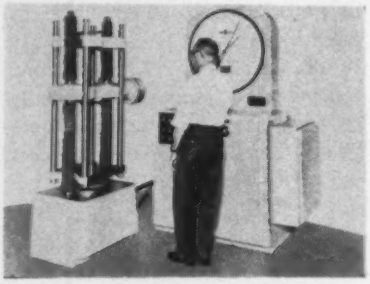
used. A motorized lower crosshead insures rapid adjustment to compensate for different specimen lengths. In use, the operator inserts the wire, presses a button, and the new unit does the rest. It loads at a preset rate from 0-3 ipm. When the wire fractures, the tester returns

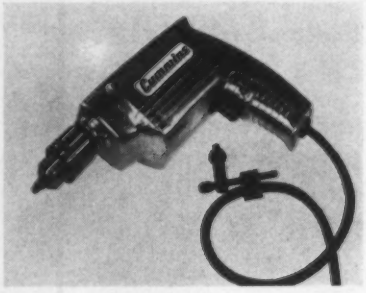


to zero load, allowing rapid removal of the tested piece. A lazy pointer shows maximum test load. (Tinius Olsen Testing Machine Co.)

For more data circle No. 49 on postcard, p. 131

Portable Power Drill

Two portable power drills, with ¼- and ⅜-in. speeds, are combined in the same unit. This low-priced unit automatically adjusts drilling speeds when in use. Loaded speed in metal for a ¼-in. bit is 500 rpm. With a ⅜-in. bit, the



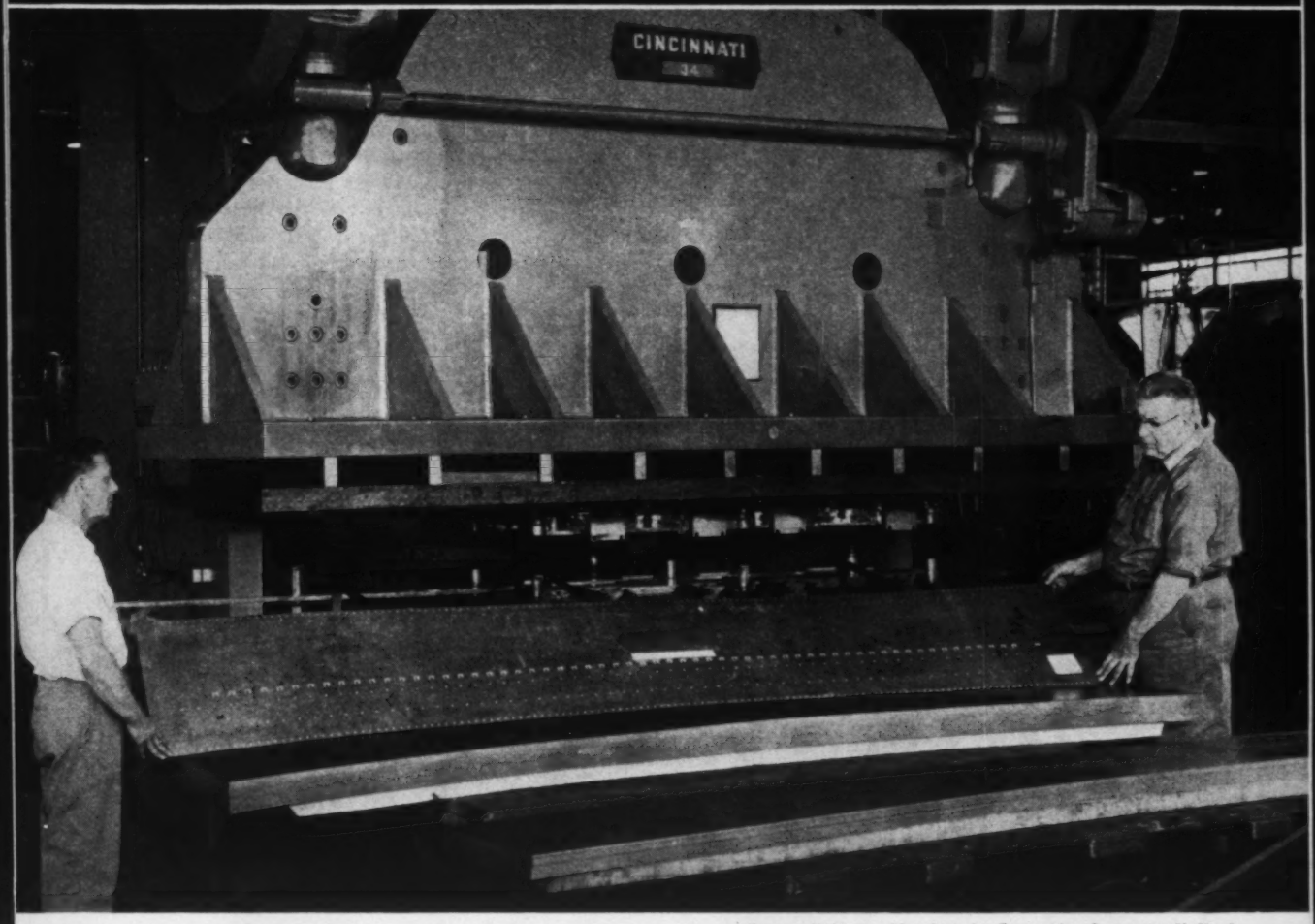
speed adjusts itself to 1050 rpm. The unit will drill 1-in. diam holes in wood and ⅜-in. diam holes in metal. (John Oster Mfg. Co.)

For more data circle No. 50 on postcard, p. 131

Picks Up, Moves Loads

A rider-type, bar-stock truck handles incoming bar-stock shipments. It moves the stock from receiving to rack storage, and from storage

CINCINNATI® PRESS BRAKE
cuts press work costs



Courtesy Dahlstrom Manufacturing Corporation, Jamestown, N. Y.

For half the initial cost of a conventional press with equal die area and tonnage, the Dahlstrom Manufacturing Corporation does its press work on a Cincinnati Press Brake with widened bed and ram.

Its low first cost has been followed by other savings, too. For example, setup and operation are easy and fast because the die area is out in front of the housings. Floor-to-floor time per piece is half what it was with previous production methods. Cincinnati accuracy holds .005" tolerances between holes.

Dahlstrom uses the full versatility of the Cincinnati Press Brake for shallow draw work, blanking, notching, and punching. Ask our representative to show you how to earn similar savings in your shop.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

United Kingdom: The Cincinnati Shaper Co., Ltd., Glasgow, Scotland

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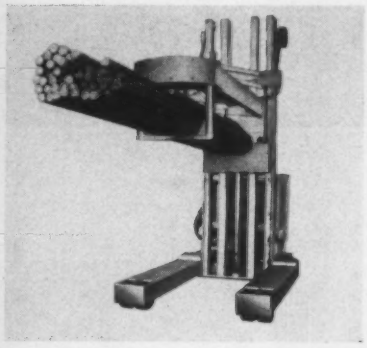
NEW EQUIPMENT

to screw machines. It's equipped with a bar-stock handling boom and hydraulic lifting tongs. Whole-



cradle loads or parts of loads are no problem. (Lewis-Sheppard Products, Inc.)

For more data circle No. 51 on postcard, p. 131

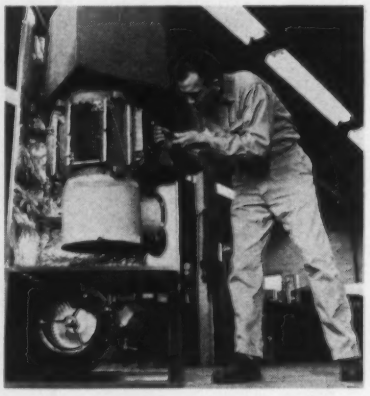
Box Furnaces

Gas fired, oil fired or electrically heated, controlled-atmosphere box furnaces maintain good temperature uniformity. The charge is heated by 100-pct forced convection. The charging door and door plate of the tightly-sealed units are of one-piece, normalized cast meehanite. Dual airdraulic cylinders raise the door. A ceramic fan circulates the protected air. Superalloyed ceramic heating tubes accomplish the heating. (Ipsen Industries, Inc.)

For more data circle No. 52 on postcard, p. 131

Drives Its Own Blower

Under development is a gas furnace that drives its own blower with power from a thermoelectric generator. The generator rates at 130 w and converts the heat of burning gas directly into electricity. This promotes improved reliabililty and lower installation costs. In addition, the built-in power source means savings in the monthly elec-



tric bill. When the furnace goes on, generator power gradually builds up. This starts the blower at a low speed that gradually increases. Thus, air delivery to the floor registers increases gradually both in velocity and temperature. (C. A. Olsen Mfg. Co.)

For more data circle No. 53 on postcard, p. 131

Profile Grinders

With spindle speeds available up to 35,000 rpm, a redeveloped line of profile grinders extends the range of precision grinding. These units handle the grinding of die clearances, cams and contours, plus a wide variety of finish-grinding jobs. These grinders are basically bench types; but they may be mounted on

New ARMSTRONG Swivel Pad can't come off

Now ARMSTRONG deep throat "C" Clamps have the new (Pat. apd. for) ARMSTRONG Ball-joint Swivel Pad. This "C" Clamp pad, developed by ARMSTRONG Engineers, is tougher than any on the market. Rigorous testing in our own plant first proved this fact, and field tests in factories throughout the country have confirmed our own test results.

Here's Why it's STRONGER...

Your ARMSTRONG Distributor can deliver these new "400-Series" C-Clamps from stock. Catalog upon request.

The lip of the opening in the ARMSTRONG Ball-joint Swivel Pad is undercut so that when the ball of the screw is inserted, and the lip is permanently forced down, a solid steel wall is formed, inside the pad cavity, completely encircling the ball.

This wall of steel makes it impossible for the pad to come off the screw during normal use. In fact, our tests have proved that it is virtually impossible to intentionally knock the pad off with a hammer —yet the pad is free to swivel through an arc of approximately 40°.

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The stainless gleam of quality

in new fashions for the home

See the many new expressions of stainless beauty and versatility on display—each with its own message of interest to you in the metals field. Note how stainless steel's strength is matched with corrosion-proof luster, easy formability, every degree of surface finish from mirror-bright to satin-smooth. And for your own stainless fabrication requirements, think of SUPERIOR—ready with the grades, deliveries and technical help to serve every need!

Superior

STAINLESS STRIP STEEL

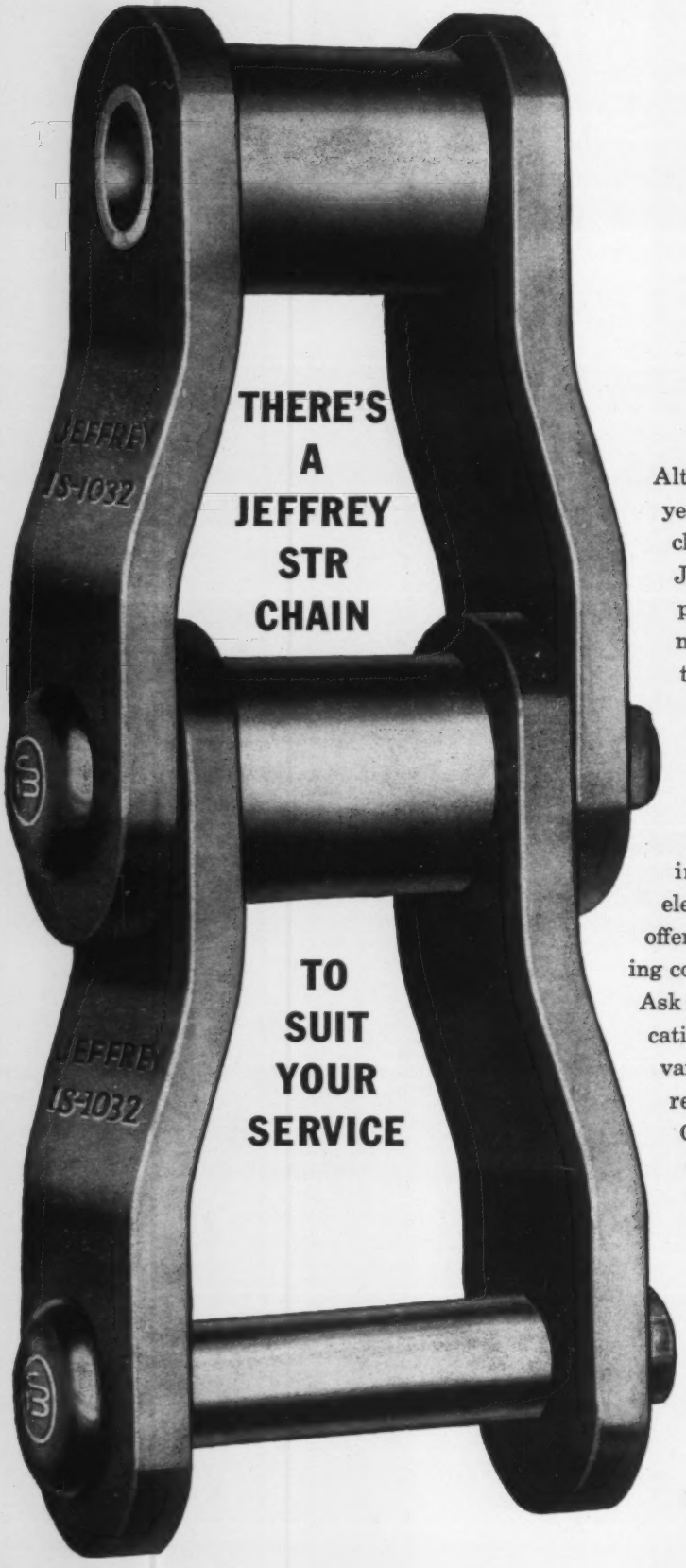
SUPERIOR STEEL DIVISION

OF

COPPERWELD STEEL COMPANY

CARNEGIE, PENNSYLVANIA

For Export: Copperweld Steel International Company, New York



Although Jeffrey patented the principle years ago, STR (Steel Thimble Roller) chain has been constantly improved by Jeffrey to keep pace with industrial progress. Components are designed, materials selected, machined and heat treated to give maximum strength, shock resistance and wearability with minimum weight.

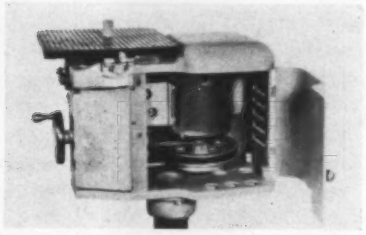
Jeffrey STR chain provides a positive yet flexible means of transmitting power for unit machinery and general industrial drives, and for heavy duty elevating and conveying service. Jeffrey offers four classes to meet various operating conditions.

Ask for engineering assistance on the application of STR chain to suit your needs. The various classes of STR chain are in stock, ready for immediate shipment to you. Chain also can be tailor-made to fit your particular requirements. The Jeffrey Manufacturing Company, 925 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...
TRANSMISSION MACHINERY... CONTRACT MANUFACTURING

a pedestal or floor stand. A wheel dresser is attached to the underside of each table. This dresser has no

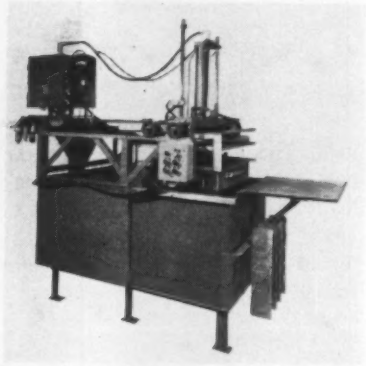


loose parts. Hence, it's always ready for action. (Rice Pump & Machine Co.)

For more data circle No. 54 on postcard, p. 131

Thermal-Shock Machine

From cycle start to cycle finish, the operator of a new thermal-shock machine has full control over the entire test setup. He can stop the carriage at any point. Thus, he can override any position and return the carriage to its original position. Designed to test glass containers that



are 9 in. or 12 in. high, the basic machine can be used in other branches of industry. (Henry F. Teichmann, Inc.)

For more data circle No. 55 on postcard, p. 131

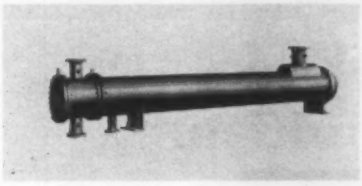
Drill Sharpener

For high-speed steel twist drills, a drill sharpener speeds the sharpening rate three to seven times faster than conventional grinding. It doesn't generate any heat that may alter the structure of the metal. A simple setup of drill holding fixtures makes possible a greater degree of control of drill point geometry. The versatility of the unit allows all drill point angles from 90°-180°; lip relief angles from 0° to 20°; helix angles from 30° positive to 30° negative. (Connecticut Special Machine, Inc.)

For more data circle No. 56 on postcard, p. 131

Heat Exchangers

Reflecting the company's long experience in building custom shell-and-tube heat exchangers for the petroleum, chemical and other industries, a new line of pre-engineered exchangers use standard



components in three tube lengths. These lengths are 16, 20 and 24 ft. Shell diameters range from 21-45 in. nominal ID. Standard design pressures include 150, 300 or 450 psi on the tube and shell sides. (The Griscom-Russell Co.)

For more data circle No. 57 on postcard, p. 131

Inert Gas Welder

With 100-pct arc stability, an inert gas welder welds large weldments down to fine wire. It is particularly adaptable to welded-wire modules. The machine is fully resonated. There are four overlapping current ranges from ½-425 amp. Exotic metals and different sizes and weights of metals can be welded. (Susquehanna Sciences, Inc.)

For more data circle No. 58 on postcard, p. 131

Drilling Machine

Having unusual rigidity, a 30-in. upright drilling machine takes on large, tough jobs. It also machines all jobs in less time than smaller, conventional upright drills. The drill machine has a husky, preloaded, four-bearing spindle with 14-in. of travel and a close-coupled, 10-hp motor. Standard machine features contribute to greater operational speed. They are: an extra-wide choice of speeds and feeds; electric

BRAZE BETTER!

use

AIRCOSIL NO. 18 FLUX with New Formulation

Silver alloy brazing turns out better when you use new *Aircosil No. 18 Flux*. Won't break down under long heat cycle up to approximately 1450°F. Chemicals stay in suspension, thanks to a new and improved formulation.

Won't spatter. Residue washes off with hot water. Long shelf life, because jar has new cover with flowed-in rubber seal. Supplied in ½, 1, and 5 pound jars; 30 and 50 pound containers.

For highest quality brazed joints on a wide range of ferrous and nonferrous alloys – use new *Aircosil No. 18 Flux*. Immediate delivery and complete information from your nearest Airco office or local distributor.

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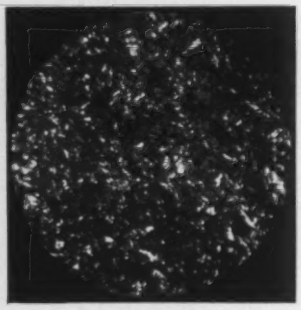
Authorized Distributors in most principal cities

Wheelabrator steel shot® cleans faster because it's harder



Microstructure of Wheelabrator Steel Shot. Magnification is 500 diameters. 2% Nital etch.

A demonstration of WHEELABRATOR'S

VITAL VALUES

The harder the abrasive, the faster it cleans. And Wheelabrator Steel Shot is hard—6 to 10 Rockwell points harder than any other steel abrasive. In addition, it is heat treated to give maximum toughness and longest fatigue life consistent with its uniform high hardness. Thus, you receive the Vital Value of extra savings through reduced abrasive consumption, plus faster cleaning speed because of the higher hardness. Wheelabrator experience in pioneering airless blast cleaning progress always has meant greater savings for you. For the full story of the Vital Values and savings built into Wheelabrator steel abrasives, write for Bulletin 903-D.

VITAL VALUES FOR INDUSTRY

WHEELABRATOR STEEL ABRASIVES

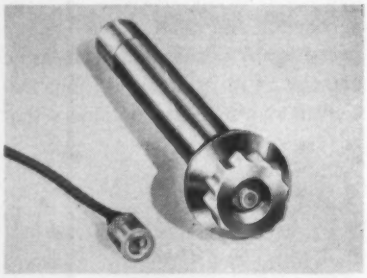
WHEELABRATOR CORPORATION, 510 S. Byrkit St., Mishawaka, Ind.
In Canada, WHEELABRATOR CORP. of Canada, Ltd., P.O. Box 490, Scarborough, Ont.

and hydraulic controls; automatic electric tapping reverse. Also included are a magnetic clutch that never needs adjustment and an adjustable hydraulic spindle counterbalancing. The tapping reverse operates automatically to any preset depth. The machine also features as standard a number 5 Morse taper for larger tooling. (Giddings & Lewis Machine Tool Co.)

For more data circle No. 59 on postcard, p. 131

Strain-Gage Bolt

Now, bolts come with strain gages as an integral part. This new bolt has strain gages installed in the neutral axis of the bolt shank. The strain gages have a screw-type connector imbedded in the bolt head. There's no reduction in allowable



load. The gages don't change the bolt shape in any way. Tightening loads or changes in bolt load due to vibration, shock or wear may be observed and recorded. (Polyphase Instrument Co.)

For more data circle No. 60 on postcard, p. 131

Guards Against Rust

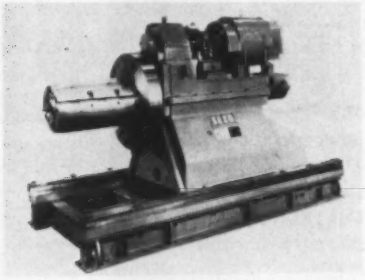
Excellent cleaning properties plus adequate rust protection; this combination is available in a new alkaline cleaner. It doesn't stain machined parts, and it's easy to control. Field-test reports show good results in shops using power washers to clean shop oils and dirt from parts which require storage prior to assembly or further machining. (Kerns United Corp.)

For more data circle No. 61 on postcard, p. 131

Uncoiling Unit

Normally, coil steel is slit into narrower coils as it's pulled through

a slitter by a recoiler. But with light-gage stock, pull-through slitting can be improved. A new uncoiler features a totally-enclosed oil-tight gear drive and a drag-gen-

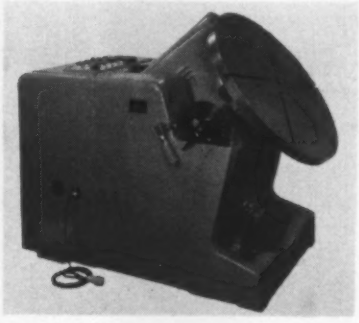


erator unit. The latter maintains strip tension during slitting. It also supplies power for "feed up" while the strip is being threaded through the slitting line. (Steel Equipment Co.)

For more data circle No. 62 on postcard, p. 131

Positions Turntables

A new positioning machine features a rugged motor-driven turntable on which weldments and other assemblies may be mounted for precise positioning and rotation during welding or fabrication operations. The machine's 32-in. diam faceplate handles assemblies weighing up to 2000 lb. All internal components are easily accessible. A control knob permits selection of



rotation speeds from 0-4 rpm. Visual indications of rotation speed is shown by a meter calibrated in rpm. (Boesch Mfg. Co.)

For more data circle No. 63 on postcard, p. 131

Electrical Conductors

Two high-voltage electrical conductors, made entirely of aluminum, will soon be installed on a 460,000-v

final touch-up
fast and clean!

fine-line separations between colors made sharp with masking

TAPES FROM 3M

The final touch of quality for Evinrude outboard motors goes on easily and quickly with the help of masking tapes from 3M. After motor shrouds are covered with flexible shields and sprayed, separation between colors is ragged. Application of "Scotch" Brand Masking Tape and a quick final touch-up spray makes the separation sharp and clean.

TRY THIS METHOD. See how it speeds finishing operations and improves results. Ask your 3M Representative or nearest "Scotch" Brand Tape Distributor for a demonstration, or write: 3M Co., 900 Bush Ave., St. Paul 6, Minn., Dept. IBU-31.

REG. U.S. PAT. OFF. SCOTCH BRAND tapes for industry

Minnesota Mining and Manufacturing Company
...where research is the key to tomorrow

3M COMPANY

"SCOTCH" IS A REGISTERED TRADEMARK OF 3M CO., ST. PAUL 6, MINN.

GOT A JOINING PROBLEM?

Having trouble with corrosion? Dissimilar or unusual metals? Successive joints on the same work? We'll tackle it . . . at no cost to you.

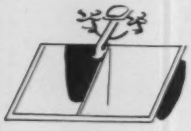
Tough joining problems gave this company its start. Every time we solved a problem we had a new customer . . . and often a new product to sell! That's how we got into the special alloys business in 1946. That's how we grew.

FOR EXAMPLE

Automobile air conditioning units called for a low-cost but highly corrosion resistant heat exchanger with freon-tight seals in aluminum tubing. ALL-STATE developed a cadmium-zinc alloy that was low in cost, resistant to all atmospheric conditions, and leak-proof. Same alloy now used for repair of automobile radiators.

Our 430° non-acid flux was developed for joining stainless with minimum hazard to users. A subsequently discovered application was joining Hydro T-metal without discoloration.

It took months to figure out how to braze the cathode wire to the terminal inside radio vacuum tubes without blackening the inside of the tube. Our silver-copper-indium alloy lowered brazing temperature without increasing vaporization rate, solved the problem.



Stainless steel kitchen sinks became economically feasible only after we helped a manufacturer solve the problem of a perfect color match with a monel gas welding rod.

We still like tough joining problems. That's why we invite you to put your joining problem up to us. We may fail or succeed, but we'll work on it with the best research brains and equipment, and it won't cost you a penny.

Write and tell us what your joining problem is, with the essential details.

Send for a free copy of our 56-page Manual and Catalog.

Distributors everywhere

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QUALITY WITH SERVICE

THE LITTLE AND THE BIG IN PERFORATED MATERIALS

Standard Mundt perforations range from 950 holes per square inch to 0.046 holes per square inch in round hole patterns. You'll find equal variety in square, oblong, diagonal, diamond, herringbone and other decorative and functional patterns.

Mundt perforates all basic metals and alloys as well as bonded, coated, clad and textured metals, plastics, plywood, fibre and wood. Where a product has not been previously perforated, we will make an experimental run without charge to determine perforating qualities.

You'll find Mundt is small enough to take an interest in your minor perforation problems . . . large enough to provide quick delivery from its vast stocks. Write for the new Mundt catalog for your design and purchasing files.

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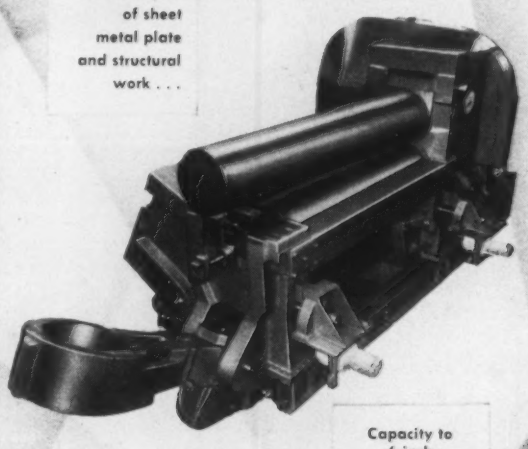
OUR 92ND YEAR
53 FAIRMOUNT AVENUE, JERSEY CITY 4, N. J.

Our Line

Light and heavy machinery for all classes of sheet metal plate and structural work . . .



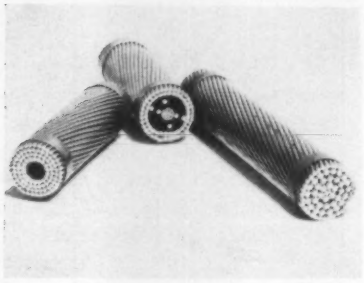
Capacity to 6 inch plate cold

THE LARGEST EVER BUILT

ORGANIZED 1879. INCORPORATED 1911

BERTSCH & COMPANY
CAMBRIDGE CITY INDIANA

test line. One conductor employs a "rope lay" configuration that measures 2.13 in. diam. This is the first time such a concept has been ap-

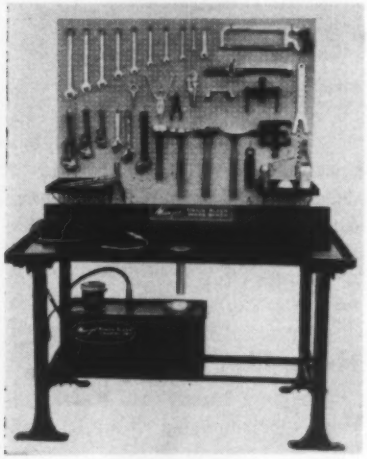


plied to a conductor of this size. The other new conductor incorporates a flexible-aluminum conduit as the expanding medium. Its stranding consists of 4 layers of 5005 alloy wire, helically wound around the core. Overall conductor diameter is 2.14 in. The flexible conduit core is a standard 0.825-in. OD flexible conduit. (Aluminum Co. of America)

For more data circle No. 64 on postcard, p. 131

Cleaning Work Bench

The table top's raised lid and gradual taper to a center drain prevents oil dripping to the floor from a special work bench developed for the metalworking industry. No oil on the floor means a clean shop with fewer accidents and less fire



hazard. The bench has two pieces of optional equipment: A heavy-duty tool board and a powered cleaning unit. The mechanic's com-

trim the cost of trim painting!

fast and fancy finishing when you use masking

TAPES FROM 3M

The Harley-Davidson Motor Co. chooses masking tapes from 3M to speed much of the decorative trim painting on their products. Curved surfaces . . . complicated designs . . . the need for perfect results make "Scotch" Brand Masking Tapes especially desirable. These tapes from 3M conform easily . . . stick at a touch . . . remove cleanly and easily . . . leave no adhesive residue.

TRY THIS METHOD. See how it speeds finishing operations and improves results. Ask your 3M Representative or nearest "Scotch" Brand Tape Distributor for a demonstration, or write: 3M Co., 900 Bush Ave., St. Paul 6, Minn., Dept. IBU-31.

SCOTCH BRAND
tapes for industry

Minnesota Mining and Manufacturing Company
. . . where research is the key to tomorrow

3M COMPANY

"Scotch" is a registered trademark of 3M Co., St. Paul 6, Minn.

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STAINLESS

pipe & fittings in stock...

Stainless steel piping for process installations, like the one pictured in Mogen David Wine Company's modern Chicago plant, can be readily supplied from our warehouse stock.

We maintain a large inventory of light-wall, standard, and extra-heavy stainless pipe in a variety of sizes and analyses—plus threaded and welding fittings, and valves.

Rely on C. A. Roberts Co. for prompt service and expert technical assistance on your Stainless Piping requirements.

C. A. ROBERTS CO.

Steel & Aluminum Tube Specialists

Dept. I-3, 2401 25th Avenue, Franklin Park, Illinois

6 warehouses serving the middlewest

CHICAGO • DETROIT • INDIANAPOLIS
ST. LOUIS • TULSA • N. KANSAS CITY

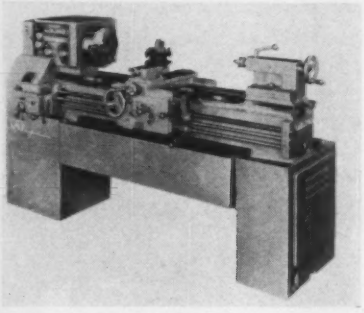
NEW EQUIPMENT

plete needs are available — parts cleaning, functional work area and required service tools. (Manzel)

For more data circle No. 65 on postcard, p. 131

Low-Cost Lathes

New design features are apparent in the headstocks of 10 different lathe models ranging in capacity from 13-24 in. These redesigned lathes incorporate many heavy-duty features not ordinarily found in low-

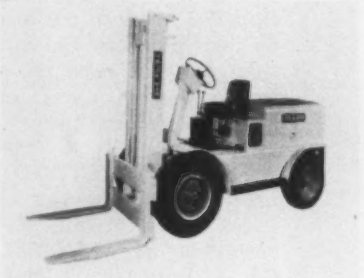


cost lathes. Among these features are heavy three-bearing spindles, automatically-lubricated and totally-enclosed quick-change gear boxes, compensating V-ways and motors enclosed in head legs. (R. K. LeBlond Machine Tool Co.)

For more data circle No. 66 on postcard, p. 131

Lift Truck

A new 3-ton fork lift truck features power steering as standard equipment. The power steering eliminates the column, pitman arm and drag link, making it much easier to work on or to replace the clutch. The linkage has been in-



verted and tucked up under the truck. Other features include: A 12-v electrical system for rapid cold-weather starts; an exhaust system with an automotive header pipe and large muffler to reduce back pressure and for quieter operation; and an instrument panel placed for convenient checking by the driver. (Truck-Man Lift Trucks)

For more data circle No. 67 on postcard, p. 131

Increases Belt Life

An improved belt lubricant increases belt life from 20-120 pct. It keeps the belts open and insures free cutting at all times. This lubricant will pass through both alkaline cleaners and vapor degreasers. It doesn't contain fillers. (American Buff Co.)

For more data circle No. 68 on postcard, p. 131

Portable Welder

A new portable, medium-duty, ac arc welder meets the needs of small scale production and maintenance welding jobs. The 180 amp unit is mounted on heavy-duty wheels and can be moved easily. Full 80-v open

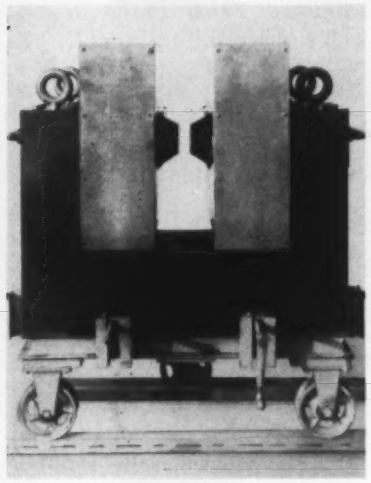
circuit voltage allows welding with all types of electrodes from 1/16-3/16 in. diam. An automatic balance volt-arc feature provides a deep penetrating arc at high ampere settings and a soft arc at low settings for light-gage metals. (Metal & Thermit Corp.)

For more data circle No. 69 on postcard, p. 131

Huge Electromagnet

Ideal for many lab uses, this large electromagnet, coupled with its variable power supply, is a valuable research tool. It gives a 20,000-gauss (magnetic-density) field over a large area with a 1½-in. gap. It operates at maximum level

for 30 minutes. Pole faces are soft steel or inconel. A roller-and-rail system, with mechanical jacks, al-

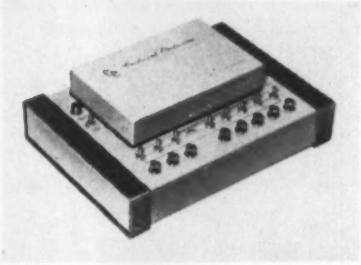


lows two degrees of freedom in locating the gap. It's available as an option. (MHD REsearch, Inc.)

For more data circle No. 70 on postcard, p. 131

Portable Controls

Controlled by punched tapes, a portable control center can be set up quickly or modified in a few minutes. In operation, the control center initiates an on-off circuit in 8 separate switches, at any time interval from 30 milliseconds to 2 years. Switching circuits can con-

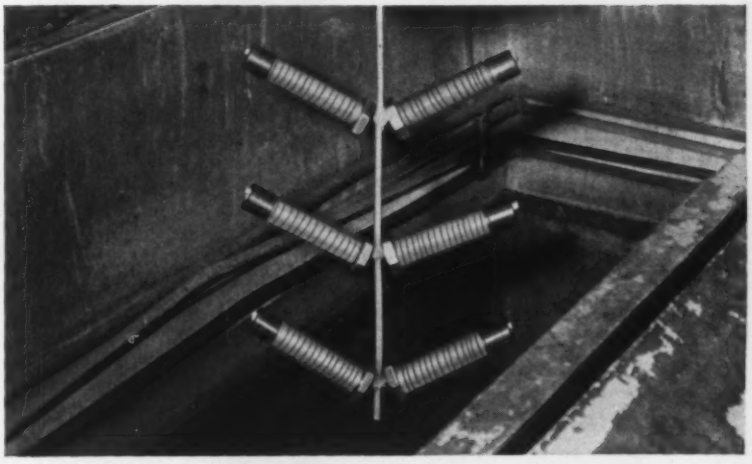


trol solenoid valves which in turn control hydraulic or pneumatic equipment. (Cresmont Electronics)

For more data circle No. 71 on postcard, p. 131

Feeds Metal Blanks

Blanks are picked up one at a time from the stack top with a high-speed feeding machine. It's fully protected against double feeds and handles normal-size blanks without adjustments. The feeder adapts to any type of press, shear or brake. Its pick-up timing coordinates with



mask simple shapes or complex contours

plating solutions can't creep under these tight-sticking

TAPES FROM 3M

Stop-off masking and rack wrapping are fast, easy, sure when you choose tapes from 3M for the job. "Scotch" Brand Electroplating Tape No. 470, developed especially for plating applications, is strong, conformable and has a backing that resists effects of most solutions.

Other electroplating tapes too: one that's extremely thin, tough, transparent; another backed with lead foil for use where "thieving" action is required.

TRY THIS METHOD. Ask your 3M Representative or nearest "Scotch" Brand Tape Distributor for a demonstration, or write: 3M Co., 900 Bush Ave., St. Paul 6, Minn., Dept. IBU-31.

SCOTCH BRAND tapes for industry

Minnesota Mining and Manufacturing Company

...where research is the key to tomorrow

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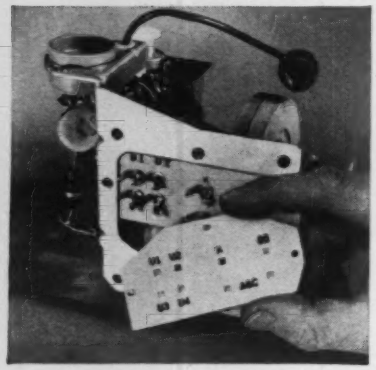
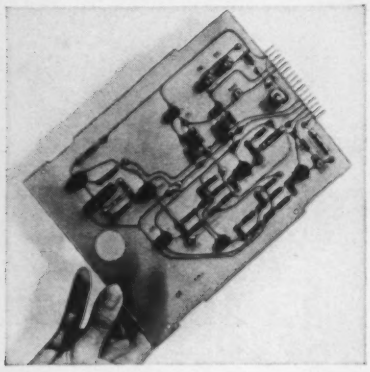
Taylor glass-base laminates pop right out as design materials in many applications

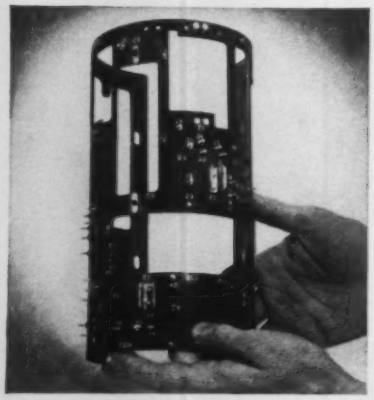




There are good reasons for investigating Taylor glass-base laminated plastics as high-strength-to-weight materials in your design. They offer light weight, corrosion resistance, electrical and thermal insulation, and ease of fabrication.

For example, glass-fabric-base laminates have the highest mechanical strength of all laminated plastic materials. They have been successfully used in the fabrication of critical parts, including aircraft parts and bases for printed circuits. They are most valuable where extremely low moisture absorption, increased heat resistance and superior electrical properties are required.

Taylor Fibre produces a number of different glass-base grades in sheet, rod and tubular form, and copper-clad. Those with phenolic resin are recommended for mechanical and electrical applications requiring heat resistance. Those with melamine are characterized by their excellent resistance to arcing and tracking in electrical applications. They also have good resistance to flame, heat and moderate concentrations of alkalis and most solvents. Those with silicone exhibit very high heat resistance, combined with good mechanical and electrical properties. They also have highest arc resistance. Those with epoxy offer extremely high mechanical strength, excellent chemical resistance, low moisture absorption, and high strength retention at elevated temperatures.



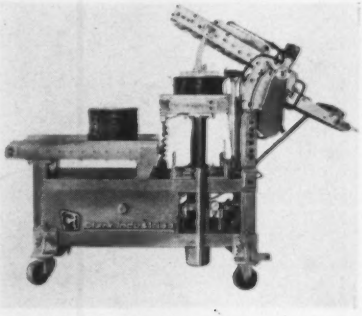
Technical data about these and other Taylor laminated plastics are available. Ask for your copy of the Taylor Laminated Plastics Selection Guide. Taylor Fibre Co., Norristown 52, Pa.

Taylor

LAMINATED PLASTICS VULCANIZED FIBRE

NEW EQUIPMENT

the operating machine for minimum setup time. Powered magnetic rolls and a magnetic belt transfer the

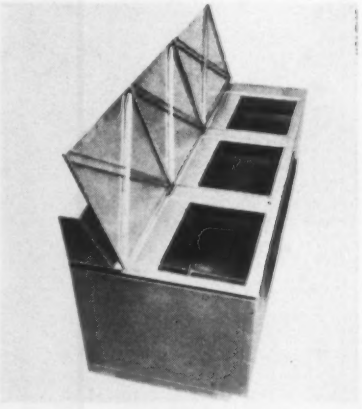


blanks from pick-up stations to the process machine. Models come with semi- or fully-automatic controls. (Clark Industries)

For more data circle No. 72 on postcard, p. 131

Cleaning Equipment

A cascade-rinse unit uses three rinse stations. The rinse solution is pumped into the first station. It overflows into the second and subsequently into the third. At the third station, it's drained for subsequent rejuvenation; then it's recirculated. Parts being rinsed are submerged in chamber three. This is followed up with immersion in chamber two and then chamber one.



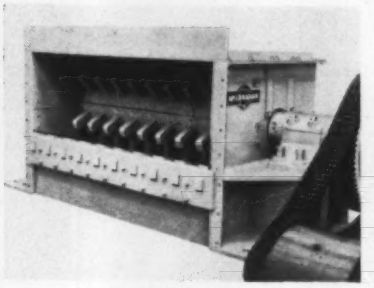
After rinsing, a forced-air blower dries the parts. (Pioneer - Central Div., The Bendix Corp.)

For more data circle No. 73 on postcard, p. 131

Breaker Crushes Sinter

A new breaker crushes sinter as it's delivered from the press. Us-

ing integral 9-in. hard surfaced teeth the breaker crushes the sinter against special alloy grizzly bars. The unit was developed for heavy-duty, continuous service in crushing extremely abrasive, high-temperature materials. The breaker is made in 72-in. and 94-in. widths, each with a roll diameter of 24 in. The crushing roll and roll shaft



bearings can be water cooled to fit the application. (McClanahan & Stone Corp.)

For more data circle No. 74 on postcard, p. 131

Ultrasonic Shake Table

An ultrasonic vibration table covers a frequency range from 20-100 kc. The motion curve has flat amplitude throughout the frequency range. 4000-g acceleration is possible. Difficulties due to high-frequency acoustic noise hamper many airborne defense systems. Because an ultrasonic vibrator can excite components into natural resonance, it permits lab analysis of the fatigue caused by this condition. (Ultrasonic Industries)

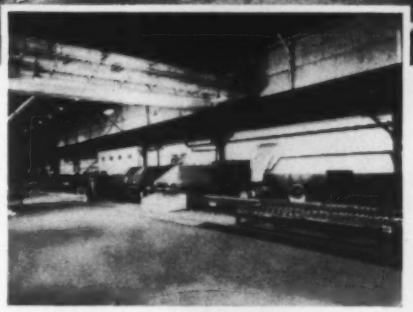
For more data circle No. 75 on postcard, p. 131

Automated Magnetizer

For semi- and fully-automatic operation, a ½-cycle, impulse magnetizer gives fast response and cycle time. It works manually or by cam. Trigger it as often as you like; there's no time-consuming charging interval. Special dc equipment isn't needed. Also, the circuitry's simple. There's an ignitron tube and a control circuit. When the ignitron fires, the coil is put across the line for ½ cycle or less. A single-phase, 220/600-v ac feeder provides all necessary power for the magnetizer. The control circuit operates on 110-v ac. (Indiana General Corp.)

For more data circle No. 76 on postcard, p. 131

"YOUNGSTOWN"
81" SHEET SCRUBBER LINE



Entry end of "Youngstown" 81" sheet scrubber line at United States Steel's Irvin Works.

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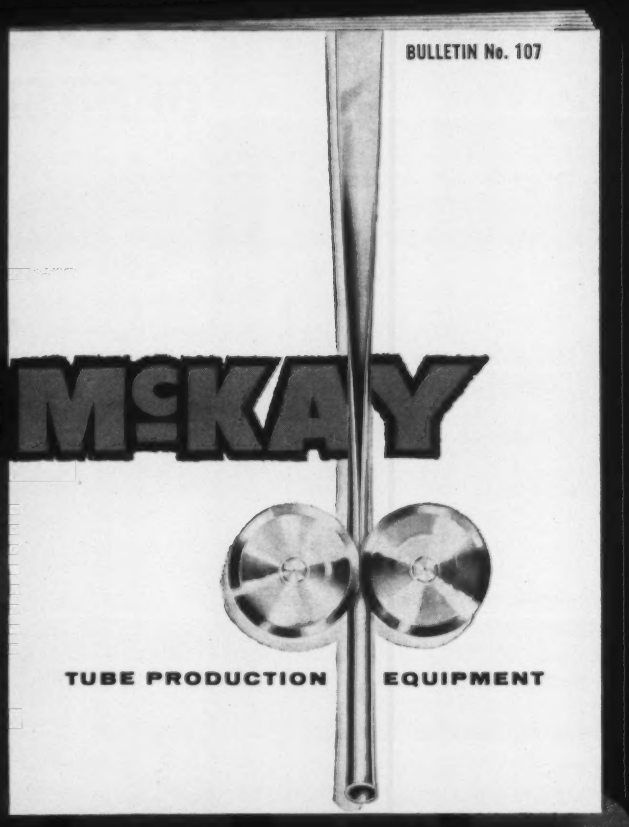

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Market Advance Gains Strength

On a broad base, the steel market continues to gain, although progress is slow.

Products involved cover a wide range, but automotive steel ordering continues well below par.

■ The steel market continues to advance on a broad base. In spite of some reservations, the market tone after several weeks of slow improvement, remains optimistic.

Except for automotive steel products, orders for steel are picking up across general market areas.

These include construction products, galvanized sheets, tinplate, plates and structurals, wire and wire rods. In some cities, lead time on a few products is stretching out a bit.

While most steel products can be ordered on a fast delivery basis, ordering in advance is growing.

Strong Points—These are indications of a strengthening market:

March is shaping up as the best month since the first half of 1960 for shipments of plates and structurals. This is not a major jump, but it is bringing production of heavy steels, which has been hard-hit, close to the overall operating rate.

Tinplate is being ordered on a more advanced basis. One mill says it is reaching a point where it can take no more April orders for either conventional tinplate or the new thin tinplate. Releases indicate canmakers are still holding tinplate stocks to a bare minimum.

Midwest Indicators — Although the automotive steel market continues to hold back overall optimism, there is some evidence that the market is firming, or at least not deteriorating.

In the Midwest, steel warehouses are hoping for a 10 to 15 pct gain in March, although the first week barely held to February levels. Another Midwest note: Wire is coming alive at a pace that has surprised producers. Bookings are coming in at a rate that has boosted some special wire product mills to nearly full capacity. This, in turn, has resulted in a surge on rod producers.

Automotive Factors—In spite of the overall market improvement, no full-blown optimism can be reflected while the automotive steel market is marking time.

Automakers are hoping for a warm weather sales rush to result in a change in plans. But right now the industry is thinking in terms of 400,000 cars in March. This will do little to improve the market and actually could result in further setbacks. Current layoffs and shutdowns in assembly plants tend to dim any hopes of a pickup in April.

Delivery dates now are so short that it is difficult to assess market trends on more than a week-to-week basis. Up to a quarter of the tonnage shipped in a given month is ordered within the first two weeks of the month.

Delivery Promises — This indicates the short lead times and also pressures on the mills. But it also points to an imponderable factor in the market: Once orders start picking up, fast delivery will not be possible. For this reason, any sharp pickup in orders, even for a short term, would result in a piling up of orders and immediate lengthening of delivery dates.

This may be behind the slow, but noticeable trend for many steel users to order a little farther in advance. It's not much of a factor yet, but it could be a straw in the wind.

District Steel Production Indexes 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	87	88	84	129
Buffalo	71	77	74	151
Pittsburgh	79	79	75	145
Youngstown	62	69	83	148
Cleveland	70	71	77	169
Detroit	90	86	91	152
Chicago	93	92	91	147
Cincinnati	86	84	92	142
St. Louis	102	108	105	128
Southern	91	88	88	130
Western	103	100	99	127
U. S. Index	84.4	84.8	84.9	139.9

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	1,573	1,580	15,141	26,919
Ingot Index				
(1957-59=100)	84.4	84.8	81.3	144.5
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel, base (cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$37.83	$35.83	$33.50	$33.50
No. 2 bundles	$27.83	$26.17	$23.83	$22.33

Industrial Trucks Add Features

Value search by buyers leads to more automated controls and triple-stage mechanisms in industrial trucks.

But prices appear to be heading upward.

▪ Today's buyers look hard for maximum value. And they look as hard for this value when buying industrial trucks as they do when buying parts and components. This attitude shapes a "new look" in industrial trucks.

Says one major truckmaker: "There does not seem to be a horsepower race in this industry like that in the auto industry. The development of industrial power trucks has brought users 'maximum efficiency.' "

This is reflected in performance value at buyers' plants. Some buyers look for a single truck that can do more than one job. This eliminates the need for several types.

Versatile — One manufacturer notes: "There is an added demand for triple-stage mechanisms. This enables the material-handling equipment to operate in closed-type highway trailers and boxcars. At the same time, it can stack high in the warehouse. There is maximum utilization of air rights."

Another industrial truckmaker says there's a buying trend toward "Automated control, plus longer-duty cycles for increased work capacities." This manufacturer adds, "The longer duty cycle is required to meet the faster speeds and higher lifts necessary to satisfy present day handling and warehousing."

Because buyers insist on both speed and ease-of-handling in material-handling equipment, riderless power trucks are in less demand. The trend is to rider-type power trucks.

One producer notes that companies are specifying "fewer but larger capacity" trucks. He finds this especially true in the metalworking field.

Outside Uses—But this trend is not apparent to others. They find buyers calling for larger capacity trucks only for outside use. These larger outside trucks are most often used in container movements. With containerization gaining headway, loaded container weights of 70,000 lb are not uncommon. This has resulted in larger capacity trucks.

Prices — Prices of industrial trucks have continued upward. And most truckmakers see little hope of holding present price levels through the rest of the year. The spokesman for one big truckmaker forecasts price rises of 5 to 10 pct about the middle of the year. But if steel holds its price line he has hope that his forecast is off.

Says another major truckmaker: "With higher wages a certainty, and with costs up for components, it seems quite possible that price increases will be necessary."

One manufacturer points to new buyer demands as part of the reason for price advances. He cites "increasing need to develop and manufacture specialized handling equipment."

Leasing — Leasing continues to draw buyer interest. Plans are now available that supply truck operators as well as the equipment and all maintenance. These plans are offered by both truck producers and leasing companies.

Trucks with custom features are also available under leasing plans. A broadening of rental plans has buyers shopping more carefully.

LOW-SLUNG: Compact design allows truck to move easily through low overhead. Buyers demand equipment to "direct load" vans and boxcars.

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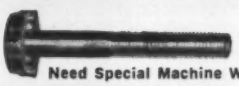

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Heavy Steels Gain As Spring Nears

Demand for heavy steels, particularly structurals, is beginning to bolster the market.

More spending for roads and government buildings, plus an expected increase in commercial building, add support.

■ Heavy steels are beginning to add their weight to the upward thrust of the market.

Not all areas are sharing in the gains to the same extent. But the general direction is upward. And even those areas which aren't moving ahead very significantly are at least optimistic about the prospects for the near future.

No Boom Yet — This doesn't mean that the order volume has reached boom levels. Pittsburgh sources say it reflects a slow and steady improvement for wide flange beams and plates. Even so, March is shaping up as the best month since the first half of last year for at least one producer of plates and structurals.

Mills look for this trend to continue, although advance bookings for April are running a little behind the March advance. With late ordering still the rule, the slight lag isn't considered significant.

Construction is credited with being the force behind the gains. Preparation for the usual spring pickup and work already underway are important factors in helping Cleveland area mills offset losses from automotive customers.

Improved Outlook — As a side effect, there has been a strengthening of demand for forging quality bars. This is due to increased activity on the part of farm implement, roadbuilding and construction equipment makers.

The gloomiest appraisals of the heavy steel outlook come from the East Coast, particularly plate mills. With few exceptions, the plate mills have plenty of idle capacity. And those with fair orders aren't turning away any customers if they can help it.

But all of the mills expect the second quarter to show an improvement. Part of this should come from orders for petro-chemical process vessels, the mills say.

Good Start—Government spending is expected to provide an added stimulus in the form of the Federal road program and construction of government buildings. That word comes from James M. Straub, president of the American Institute of Steel Construction.

January, he said, put the year off to a good start. Industry-wide figures for new orders for January totaled more than 272,000 tons. This was a 22 pct increase over December, 1960, bookings. And it was 23 pct greater than January, 1960.

Roads and Buildings—"Increased revenues from the Federal gasoline tax have boosted the Highway Trust Fund," he pointed out. "This, combined with increasing government stimulation of highway construction, should have a markedly favorable influence on the demand for fabricated structural steel for bridges in the year ahead."

He also said that increased government spending for public buildings, and huge projects under the national defense and space programs, will boost structural steel fabrication. And commercial construction is expected to show an increase of at least 6 pct over 1960.

Wire—Demand is picking up at such a rate that some mills in the **Midwest** believe that delivery promises will be extended one to two weeks by the beginning of next month. Some special product wire mills in the **Chicago** area are already up to a full 21 turns. Gains are in both merchant wire products and industrial wire grades. Some mills expect March shipments to rise 20 to 25 pct over February, if orders continue to come in at the same rate. On the **West Coast,** U. S. Steel Corp. has started an all-out campaign to regain a large amount of the steel baling wire business from foreign competition. The move centers on the Central Valley section of **California** where 50 pct of the 12,000 tons of baling wire used annually has been imported. USS plans to sell the natural advantages of the domestic wire—availability and service.

Tinplate—Orders are moving up sharply. An **East Coast** supplier says buyers are taking in good tonnages. A mill in the **Pittsburgh** area says it now has about all of the orders it can take for April for both conventional and thin tinplate. However, shipments haven't moved directly with the order increase. Canmakers are still releasing tinplate only as they need it. There is still none of the usual pre-season stocking that has been normal for this time of the year. In the **Midwest,** Inland Steel Co. is the latest to announce that it is offering thin tinplate.

PURCHASING AGENT'S CHECKLIST

Recession puts more emphasis on effective control of industrial inventories. P. 82

Machining improved with use of TV screen and camera. P. 99

Are price increases for aluminum likely? P. 168

COMPARISON OF PRICES

(Effective March 13, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Mar. 13 1961	Mar. 6 1961	Feb. 13 1961	Mar. 15 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Mar. 13 1961	Mar. 6 1961	Feb. 13 1961	Mar. 15 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb.‡	11.00	11.00	11.00	11.00
Pig Iron Composites: (per gross ton)				
Pig iron	$66.44	$66.44	$66.44	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$35.50*	$34.50	$31.50	$34.50
No. 1 steel, Phila. area	40.50*	38.50	38.50	35.50
No. 1 steel, Chicago	37.50*	34.50	30.50	30.50
No. 1 bundles, Detroit	32.50*	31.50	28.50	30.50
Low phos., Youngstown	39.50	39.50	34.50	37.50
No. 1 mach'y cast, Pittsburgh	45.50	45.50	44.50	52.50
No. 1 mach'y cast, Phila.	49.50	49.50	48.50	51.50
No. 1 mach'y cast, Chicago	51.50*	49.50	46.50	51.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$37.83*	$35.83	$33.50	$33.50
No. 2 bundles	27.83*	26.17*	23.83	22.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75	15.50 14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	29.00	29.00	29.00	33.00
Copper, Lake, Conn.	29.00	29.00	29.00	33.00
Tin, Straits, N. Y.	100.50†	100.50	100.50	100.25
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	26.00	26.00	26.00	28.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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*** Appears in the March 9-March 23 issues.**

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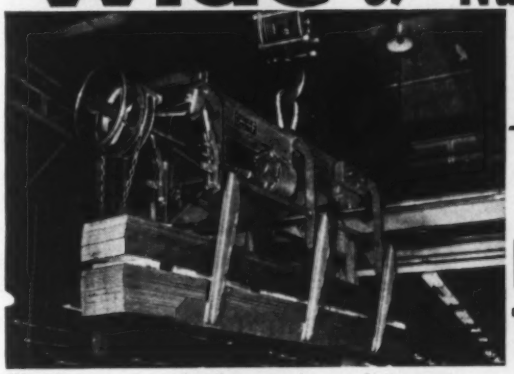

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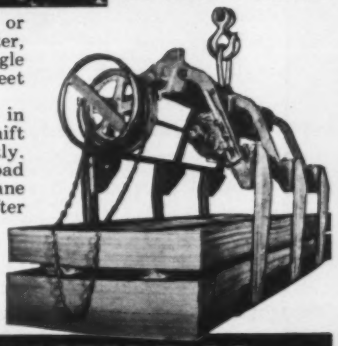

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Japanese Order, Prices Climb

The Japanese have come through with orders for the second quarter. Increased shipments are reported.

With this news came sharp price rises in export areas.

■ Scrap prices in most key areas continued the sharp climb that has characterized recent weeks. Latest reason for the climb: Japanese commitments for the second quarter.

Reports say the Japanese have ordered between 120 and 130 cargoes for the next period. This is almost a third more than in the first quarter. With this revealed Japanese interest also come reports that European exporters will move to increase shipments. All of this will probably result in even higher prices.

Based on this export demand, prices on the West Coast climbed $5 this week. Some East Coast port areas are talking prices which are $3 higher than last week.

Railroad lists also caused sharp price rises. In Chicago, prices for No. 1 grades are up $3. Pittsburgh, pressured by outside demand, has slight price increases this week.

Overall, though, domestic demand still remains weak. But many scrapmen still refuse to sell large tonnages at present price levels. This means they expect U. S. buyers to enter the market soon, causing even sharper rises.

Pittsburgh — Outside pressures brought selective price increases this week. There is no new local buying, but No. 1 grades are being drawn out of the district by prices up to $40. Also, export demand continues to push railroad prices up and to divert scrap from the area. No. 1 railroad heavy melting scrap jumped more than $3 on one major list. Other grades show smaller gains. There is talk of dealer scrap going for export, but trade sources say it would take a delivered price of nearly $50 to move significant quantities.

Chicago — The market broke through previous ceilings as railroad list prices advanced sharply and some local mills began buying. Export sales moved heavy tonnages of railroad material from the area. New Canadian orders for cast and melting grades were offered at advancing prices. Industrial scrap continues at a low output level.

Philadelphia—Japanese commitments for the second quarter have forced export prices up. However, domestic demand is still scattered. Good weather and this increased foreign interest are keeping scrap moving at a steady pace in the area.

New York — As had been expected, two Japanese groups will buy substantially more steelmaking scrap in the second quarter. Estimates put the Japanese intentions at 120 to 130 cargoes. This is compared to about 95 cargoes in the first quarter. The move had an instant strengthening effect on this market. Steelmaking grades are up $3 and very strong at that level. Dealers expect European exporters to speed up buying as a direct result of the Japanese demand.

Detroit—The market is hard to predict as far as future prices are concerned. There is evidence of heavy export buying. This is primarily by the Japanese through Chicago brokers. Interest is mainly in No. 1 steel. No one knows what the ceiling is in tonnage or price. Some reports say recent demand for exports has been almost insatiable.

Cleveland—Scrap is moving fairly well on routine orders. But dealers are reluctant to move major tonnage at present price levels. Rail bids are higher with support from export.

Cincinnati—Area mills are seeking a better barge rate to New Orleans to get into export. The present rate is $10, including port costs; dealers hope for $6. Area shipments are moving well including some No. 2 bundles to upriver markets.

St. Louis — A flurry of buying sent scrap prices soaring in this area. Openhearth grades are up $3 to $5. This is the first real change in the price pattern here in six months.

Birmingham—A large Birmingham electric furnace increased its price for electric furnace bundles and No. 1 busheling by $1. Otherwise the domestic market was slow.

Buffalo—Prices of No. 1 grades moved upward again this week. This is due to continued pressure from outside the market.

Boston — Continued export demand and some domestic activity resulted in additional price rises. The market is termed by some scrapmen as "very strong." Prices are generally up $1 for No. 1 dealer grades.

West Coast—On appraisal, the market in San Francisco, Los Angeles and Seattle moved up $5 for top steelmaking grades. One major mill is negotiating for sizable tonnages.

Houston—Resumption of export activity has strengthened the market. Electric furnace purchases have perked up.

SCRAP PRICES *(Effective March 13, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	44.00 to 45.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	20.00 to 21.00
Low phos. punch'gs plate	41.00 to 42.00
Heavy turnings	32.00 to 33.00
No. 1 RR hvy. melting	40.00 to 41.00
Scrap rails, random lgth.	47.00 to 48.00
Rails, 2 ft and under	50.00 to 51.00
RR specialties	46.00 to 47.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	35.00 to 36.00
Stainless	
18-8 bundles and solids	185.00 to 190.00
18-8 turnings	105.00 to 110.00
430 bundles and solids	85.00 to 90.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	38.00 to 39.00
No. 1 factory bundles	43.00 to 44.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	45.00 to 46.00
Low phos. punch'gs plate, ¼ in. and heavier	44.00 to 45.00
Low phos. 2 ft and under	42.00 to 43.00
No. 1 RR hvy. melting	42.00 to 43.00
Scrap rails, random lgth.	50.00 to 51.00
Rerolling rails	60.00 to 62.00
Rails 2 ft and under	54.00 to 55.00
Angles and splice bars	47.00 to 48.00
RR steel car axles	63.00 to 64.00
RR couplers and knuckles	47.00 to 48.00
No. 1 machinery cast.	51.00 to 52.00
Cupola cast.	46.00 to 47.00
Cast iron wheels	37.00 to 38.00
Malleable	49.00 to 50.00
Stove plate	41.00 to 42.00
Steel car wheels	45.00 to 46.00
Stainless	
18-8 bundles and solids	180.00 to 185.00
18-8 turnings	105.00 to 110.00
430 bundles and solids	95.00 to 100.00
430 turnings	60.00 to 65.00

Philadelphia Area

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	27.00 to 28.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings	25.00 to 26.00
Low phos. 5 ft and under	41.00 to 42.00
Low phos. 2 ft punch'gs	43.00 to 44.00
Elec. furnace bundles	41.00 to 42.00
Heavy turnings	25.00 to 26.00
RR specialties	44.00 to 45.00
Rails, 18 in. and under	50.00 to 52.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	38.00 to 39.00
Cast iron car wheels	42.00 to 43.00
Malleable	45.00 to 46.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	11.00 to 12.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. 18 in. and under	37.00 to 38.00
Rails, random length	41.00 to 42.00
Rails, 18 in. and under	46.00 to 47.00
No. 1 cupola cast	37.00 to 38.00
Heavy breakable cast.	31.00 to 32.00
Drop broken cast	46.00 to 47.00

Youngstown

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Low phos. plate	39.00 to 40.00

Cleveland

No. 1 hvy. melting	$33.50 to $34.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	33.50 to 34.50
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	22.50 to 23.50
No. 1 busheling	33.50 to 34.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	40.00 to 41.00
Low phos. punch'gs plate	34.50 to 35.50
Drop forge flashings	33.50 to 34.50
Foundry steel, 2 ft & under	33.00 to 34.00
No. 1 RR hvy. melting	38.50 to 39.50
Rails 2 ft and under	51.00 to 52.00
Rails 18 in. and under	53.00 to 54.00
Steel axle turnings	26.00 to 27.00
Railroad cast	47.00 to 48.00
No. 1 machinery cast	47.00 to 48.00
Stove plate	41.00 to 42.00
Malleable	46.00 to 47.00
Stainless	
18-8 bundles	165.00 to 170.00
18-8 turnings	90.00 to 95.00
430 bundles	80.00 to 85.00

Buffalo

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 busheling	29.00 to 30.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Low phos. plate	35.00 to 36.00
Structurals and plate, 2 ft and under	37.00 to 38.00
Scrap rails, random lgth.	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	42.00 to 43.00
No. 1 cupola cast.	36.00 to 37.00

St. Louis

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
Foundry steel, 2 ft	32.00 to 33.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	21.00 to 22.00
No. 1 RR hvy. melting	35.00 to 36.00
Rails, random lengths	38.00 to 39.00
Rails, 18 in. and under	42.00 to 43.00
RR specialties	39.00 to 40.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	33.00 to 34.00
Stove plate	35.00 to 36.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	50.00 to 51.00
Unstripped motor blocks	35.00 to 36.00

Birmingham

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	35.00 to 36.00
Elec. furnace, 3 ft. & under	34.00 to 35.00
Bar crops and plate	39.00 to 40.00
Structural and plae, 2 ft.	38.00 to 39.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rail, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	39.00 to 40.00
No. 1 cupola cast.	44.00 to 45.00
Stove plate	44.00 to 45.00
Cast iron car wheels	35.00 to 36.00
Unstripped motor blocks	33.00 to 34.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	25.00 to 26.00
No. 2 dealer bundles	19.00 to 20.00
Machine shop turnings	2.00 to 3.00
Mixed bor. and turn.	3.00 to 4.00
Shoveling turnings	5.00 to 6.00
Clean cast. chem. borings	17.00 to 18.00
No. 1 machinery cast.	36.00 to 37.00
Mixed yard cast.	32.00 to 33.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	28.00 to 29.00
Drop forge flashings	26.00 to 27.00
Machine shop turn.	8.00 to 9.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Heavy breakable cast.	27.00 to 28.00
Mixed cupola cast.	34.00 to 35.00
Automotive cast.	38.00 to 39.00
Stainless	
18-8 bundles and solids	150.00 to 155.00
18-8 turnings	50.00 to 55.00
430 bundles and solids	55.00 to 60.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.50 to $29.50
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	28.00 to 29.00
Machine shop turn.	4.00 to 4.50
Shoveling turnings	7.50 to 8.00
Clean cast. chem. borings	13.50 to 14.50
No. 1 machinery cost.	39.00 to 40.00
Mixed cupola cast.	31.00 to 32.00
Heavy breakable cast.	26.50 to 27.50

San Francisco

No. 1 hvy. melting	$37.00
No. 2 hvy. melting	34.00
No. 1 dealer bundles	32.00
No. 2 bundles	23.00
Machine shop turn.	15.00
Cast iron borings	15.00
No. 1 cupola cast.	$46.00 to 48.00

Los Angeles

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	32.00
No. 1 dealer bundles	30.00
No. 2 bundles	23.00
Machine shop turn.	16.00
Shoveling turnings	16.00
Cast iron borings	16.00
Elec. furnace 1 ft. and under (foundry)	45.00
No. 1 cupola cast.	45.00

Seattle

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	36.00
No. 2 bundles	25.00
No. 1 cupola cast.	36.00
Mixed yard cast.	31.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$28.50
No. 2 hvy. melting cut 3 ft and under	25.00
No. 1 dealer bundles	28.50
No. 2 bundles	18.00
Mixed steel scrap	20.00
Bush., new fact., prep'd.	28.50
Bush., new fact., unprep'd.	22.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	36.00
No. 2 bundles	28.00
Machine shop turn.	8.00
Shoveling turnings	11.00
Cut structural plate 2 ft & under	$49.00 to 50.00
Unstripped motor blocks	29.00 to 30.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	28.00 to 29.00

Aluminum Price Hike Hinted

Price increase or price war? The aluminum industry is trying to decide. An Alcoa executive's statement last week stirred up the sharp debate.

■ Are aluminum prices going up? All levels of the industry are pondering this possibility. The pro's and con's are being sharply debated.

Aluminum Co. of America touched off the debate last week. Alcoa executive vice president M. M. Anderson denounced "destructive price cutting" in the aluminum industry. He made this charge in an address to the Society of Security Analysts in San Francisco.

Mr. Anderson contends, "The industry must develop a more mature pricing policy and regain a firm price structure at adequate levels for fabricated products."

Test Move Cited — Industry spokesmen say this may be a test move by Alcoa in a campaign to raise prices.

One major producer claims, "There's got to be a price increase this year. But it is not imminent."

Another spokesman notes that major capacity expansions came in stream during recession periods in many metal consuming industries. "Determined efforts to sell the increased production resulted in pressure on prices," he says.

Closer Balance — The solution: "Achieve a closer balance between capacity and demand," says the spokesman. He doesn't say how.

There have been no official reactions from Kaiser or Reynolds yet. And there may not be.

One fabricator claims Mr. Anderson's comments are "a smoke screen." Contrary to Alcoa's intimation, a major price war may break out in building products, he says.

Special Can Stock

Aluminum Co. of America is considering special facilities for rolling aluminum can stock.

No decision has been made. An Alcoa official says the move will depend on assurance of a volume market and the ability of can makers to use aluminum in coil form.

Aluminum men indicate the current profit squeeze must be eased through reduced costs, rather than reduced prices.

"There will be no price hikes of aluminum can stock, unless tinplate goes up first," says one spokesman.

Zinc

M. D. Schwartz, Pacific Smelting Co., painted a dark zinc picture at the 48th annual convention of the National Assn. of Secondary Material Industries in San Francisco this week.

Mr. Schwartz calls 1960 "a disastrous year for smelters of slab zinc."

He sees little chance of higher prices at present.

"It will take a resurgence of general business conditions or a drastic cutback in production to lend strength to this market," he says.

No Outside Help — And he doesn't look for much help from outside the industry.

On the request for government assistance in the form of subsidies or higher tariffs, Mr. Schwartz says, "Neither of these appear likely."

On the meeting next week in Mexico of the United Nations lead-zinc study group, he says, "It is doubtful if any remedies will be forthcoming."

Copper

The annual reports from two of the Big Three domestic producers are out. As expected, both Kennecott Copper Co. and Phelps Dodge Corp. sold more metal and made more money in 1960 than the previous year.

Kennecott's gross income in 1960 was $503 million, from $445 million in 1959. Profits were up to $77 million, from $57 million in 1959.

Phelps Dodge revenues rose from $290 million to almost $292 million, and net income from $34 million to $37 million.

In both reports there were notes of caution for 1961. But neither was pessimistic.

Robert Page, Phelps Dodge president, predicts an excess of capacity over consumption for the next few years.

Tin prices for the week: March 7 — 102.625; March 8 — 103.00; March 9—103.125; March 10—103.125; March 13—103.375*.

*Estimate.

Primary Prices

(cents per lb)	current price	last price	date o change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	29.00	30.00	1/16/61
Copper (CS)	29.00	30.00	1/11/61
Copper (L)	29.00	30.00	1/16/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig Velasco, Tex. **NICKEL:** Port Colborne, Canada. **ZINC:** prime western. Other primary prices, pg. 169.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.038	.048-.061	.077-.096	.136-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	49.2
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	13/32-1 1/2
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.13	.....	51.36	55.32
Brass, Yellow	48.10	48.39	48.04	52.26
Brass, Low	50.65	50.94	50.59	54.71
Brass, Red	51.54	51.83	51.48	55.60
Brass, Naval	52.86	59.17	46.67	57.02
Munta Metal	50.94	.....	46.25	.....
Comm. Bz.	52.98	53.27	52.92	56.79
Mang. Bz.	56.80	.....	50.20	.....
Phos. Bz. 5%	74.59	74.34	75.09	76.52

Free Cutting Brass Rod 33.71

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb) ..$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9% dollars per troy oz..$ 2.25
Iridium, dollars per troy oz.....$75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb..... 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $206 to $208
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz...$24 to $26
Platinum, dollars per troy oz...$82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 27.25
- No. 120 ..... 26.25
- No. 123 ..... 25.25

80-10-10 ingot
- No. 305 ..... 31.75
- No. 315 ..... 29.50

88-10-2 ingot
- No. 210 ..... 39.50
- No. 215 ..... 36.25
- No. 245 ..... 31.50

Yellow ingot
- No. 405 ..... 22.75

Manganese bronze
- No. 421 ..... 26.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 24.25-24.50
- 0.60 copper max. 24.00-24.25

Piston alloys (No. 132 type)...26.00-27.00
No. 12 alum. (No. 2 grade)...22.75-23.25
108 alloy 23.25-23.75
195 alloy 25.75-26.75
13 alloy (0.60 copper max.)...24.00-24.25
AXS-679 (1 pct zinc) 23.00-24.00

Steel deoxidizing aluminum notch bar granulated or shot
Grade 1—95-97½% 23.75-24.75
Grade 2—92-95% 22.50-23.50
Grade 3—90-92% 21.50-22.50
Grade 4—85-90% 21.00-22.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	25	24¼
Yellow brass	19¼	17⅝
Red brass	22¼	21½
Comm. bronde	23	22¼
Mang. bronze	18⅛	17⅝
Free cutting rod ends.	18⅝	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 25½
- No. 2 copper wire 23¾
- Light copper 21½
- *Refining brass 22
- Copper bearing material 21

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 25½
- No. 2 copper wire 23¾
- Light copper 21½
- No. 1 composition 21¼
- No. 1 comp. turnings 20½
- Hvy yellow brass solids 16
- Brass pipe 14½
- Radiators 17

Aluminum

- Mixed old cast. ..... 12½—13
- Mixed new clips ..... 14½—15
- Mixed turnings, dry ..... 13½—14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass
- No. 1 copper wire ..... 22½—23
- No. 2 copper wire ..... 20½—21
- Light copper ..... 18½—19
- Auto radiators (unsweated).. 13¼—13½
- No. 1 composition ..... 17 —17½
- No. 1 composition turnings... 16 —16½
- Cocks and faucets ..... 13 —13½
- Clean heavy yellow brass ... 12¼—12¾
- Brass pipe ..... 13½—14
- New soft brass clippings .... 13½—14
- No. 1 brass rod turnings .... 13½—14

Aluminum
- Alum. pistons and struts .... 6½— 7
- Aluminum crankcase ..... 8½— 9
- 1100 (Se) aluminum clippings 11½—12
- Old sheet and utensils ..... 8½— 9
- Borings and turnings ..... 4½— 5
- Industrial castings ..... 9 — 9½
- 2020 (24s) clippings ..... 10 —10½

Zinc
- New zinc clippings ..... 5½— 5¾
- Old zinc ..... 2¾— 3
- Zinc routings ..... 1¾— 2
- Old die cast scrap ..... 1 — 1¼

Nickel and Monel
- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 23-23.50
- Clean Monel turnings 16.50-17
- Old sheet Monel 22-23
- Nickel silver clippings, mixed. 13
- Nickel silver turnings, mixed. 15

Lead
- Soft scrap lead ..... 7 — 7½
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous
- Block tin ..... 73 —75
- No. 1 pewter ..... 55 —56
- Auto babbitt ..... 41 —42
- Mixed common babbitt ..... 9 — 9½
- Solder joints ..... 12½—13
- Small foundry type ..... 8½— 9
- Monotype ..... 8¾— 9¼
- Lino. and stereotype ..... 8 — 8¼
- Electrotype ..... 7½— 7¾
- Hand picked type shells ..... 5¼— 5¾
- Lino. and stereo. dross ..... 1¾— 2¼
- Electro dross ..... 2 — 2½

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STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3, B4, M10* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, City, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

• Electro-galvanized-plus galvanizing extras.

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		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Thin 0.25 lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*				$9.20 *U1*	$6.35 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*	Holloware Enameling 29 ga.—7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.		
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1†† R3*	7.525 *R3, S1*	9.275 *R3*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*		6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	$6.35 *T2*
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets. ** For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

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		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *P2*	6.375*P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.		5.675 *B3*									
	Fairless, Pa.	5.825 *U1*	5.825 *U1*									
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Manafield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Manafield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875*L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1, A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*		7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Mar. 13, 1961) * Special Quality.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
Se. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Mar. 13, 1961)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50-32.75	32.09	29.50-34.50	47.50	38.00	46.50	—	19.25-21.50	—	19.75-21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge Pa., *B7;* Midland Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G3;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Chicago *W7*	173	.....	.....	.....	.....	9.00	9.55†
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	193	...	214	199	9.10	9.85
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
Sparrows Pt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery† Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	7.87	9.71	10.16	10.28	8.44	9.13	8.65	11.80	17.48	16.48	21.58	20.83
Birmingham		8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	16.76	.....	.....
Boston	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.79	16.69	23.89	21.04
Buffalo	.15	8.70	9.45	11.40	11.15	8.80	9.30	8.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.85	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.90	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.69	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	11.20	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		10.17	10.98	11.35[3]	11.73	9.41	9.81	9.58	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	11.20	12.20	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.13	10.50	.....	10.79	8.81	9.16	8.97	12.89	.....	.....	.....	.....
Milwaukee**	.15	9.51	10.49	10.99	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.24	20.49
New York	.10	9.77	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.90	10.10	10.99	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		9.45	11.30	12.35	11.45	9.60	10.05	9.45	16.65	18.60	17.80	22.70	22.20
San Francisco	.10	10.27	11.79[2]	11.50	11.88	10.48	10.59	10.17	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.80	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.75	11.23	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	9.72	10.39	11.54	11.89	9.56	10.07	9.72	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13c zinc. 2 Deduct for country delivery. 1 15 ga. & heavier; 2 14 ga. & lighter. 3 10 ga. x 48 — 120.

(Effective Mar. 13, 1961)

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

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FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 65-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	33.25
0.05% C....	34.00	1.00% C....	33.00
0.10% C....	33.75	1.50% C....	32.75
0.20% C....	33.50	2.00% C....	32.50

3-5% C, 53-63% Cr, 2.5% max. Si... 26.00
4-6% C, 58-63% Cr, 3-6% Si..... 22.50
5-8% C, 58-63% Cr, 3-6% Si..... 22.50
6-8% C, 50-56% Cr, 4-7% Si..... 22.00
4.00-4.50% C, 60-70% Cr, 1.2% Si.. 28.75
0.025% C (Simplex) 31.50
0.010% C max, 63-66% Cr, 5-7% Si. 32.50
0.010% C max, 68-71% Cr, 2% Si max 31.50
0.25% C max 33.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed delivered, ton lots, 97.25% min. Cr, 1% max. Fe.
0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.
Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.)
Carloads, delivered, lump, 3-in x down, packed.
Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	22.50	14.60
Ton lots	30.45	16.05
Less ton lots	33.40	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.
Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Maganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.
Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.
Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:
Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19%	.. $98.00	$96.00	$100.50
19-21%	.. 100.00	98.00	102.50
21-23%	.. 102.50	100.00	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.
Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.
Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, frieght allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe ..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.
Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.
Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb...	2.40	3.30	4.55

(Effective Mar. 13, 1961)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y. per lb.
Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, del'd per lb con't Cb
Ton lots $3.45
Less ton lots 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb. contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.
Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb & over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

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Quan. Size Description
2—3000 HP DC MOTORS—525 V. 600 RPM Whse. M.G. Sets—2500 K.W. Whse., 2300/4160 V.
1—2750 HP DC MOTOR 450 V. 300 RPM Elliott 2200 K.W., Gen. Elec. 3 unit 450 V. DC Gen. with 3000 HP 720 RPM, 2300 V. AC Motor and Etc.
1—2250 HP DC MOTOR 600 V. 400/500 RPM, G.E. M.G. Set—2000 K.W. G.E. AC Motor—2300 V.
1—1500 HP DC MOTOR 600 V. 600 RPM Whse. M. G. Set. 1500 K.W. G.E. 13,200 V.
1—1500 HP DC MOTOR 600 V. 300/700 RPM Whse. M.G. Set—1500 K.W. G.E. 13,200 V.
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Good Sales Due Through Summer

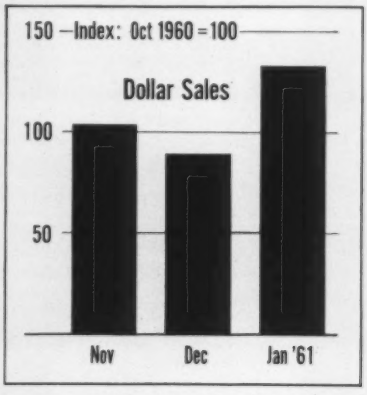
Used machinery sales are up over last year. In fact, activity in January gave dealers a shot-in-the-arm.

Now many dealers say good times should continue at least through mid-summer.

■ This year is starting with better sales for used machine dealers. And most look for the upward trend to continue through summer.

The latest figures released by the Machinery Dealers National Assn. show a marked increase in dollar sales in January. Following a slump in December, sales rose 44 pct at the first of the year. This is also 41.8 pct better than January, 1960.

The pattern of recent months (see chart) was one of faltering sales through the fourth quarter. The big



spurt came in January. Figures for February aren't ready yet, but many dealers are reporting added improvements. For example, used machine dealers in New York, Cleveland, Pittsburgh, Philadelphia and Detroit recently noted upward trends.

Other Sales—Also, the listed statistics don't really show all sales. They cover only sales where the customer was invoiced. Sales to other dealers and sales of new machines are not included.

One of the chief reasons for the sudden sales spurt has been a tightening of capital spending. More companies are spending less for machinery this year. To get more for their money, they're buying used tools.

How Long?—One Philadelphia dealer notes: "This pattern will probably hold through the summer. By August, at the latest, many industries will be going into newer equipment."

However, a Camden, N. J. dealer doesn't agree. He says "If companies keep buying good used equipment until late summer, they'll hold off on new tools until next year."

Lease-After-Auction Plan Now Offered

A Norwalk, Conn. company has introduced something new to used machine leasing.

National Equipment Rental, Ltd. now offers companies a lease-after-auction plan. According to the company, metalworkers can bid for used machinery at auctions and then lease the machinery. This eliminates the need to pay cash for used tools.

The plan will be tried for the first time next week at Colonial Manufacturing Co., Springfield, Mass. At that time, $250,000 worth of late-model tools will be auctioned by Machinery Auctioneering Corp. of New Haven.

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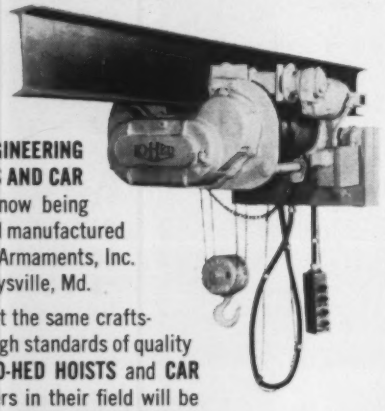
THE BIG NEWS

ABOUT AMERICAN ENGINEERING LO-HED® HOISTS & CAR PULLERS



AMERICAN ENGINEERING LO-HED HOISTS AND CAR PULLERS are now being engineered and manufactured in the Aircraft Armaments, Inc. plant at Cockeysville, Md.

Be assured that the same craftsmanship and high standards of quality which make **LO-HED HOISTS** and **CAR PULLERS** leaders in their field will be maintained in the **IMMEDIATE CONTINUED PRODUCTION** by Aircraft Armaments, Inc.

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AIRCRAFT ARMAMENTS, INC.
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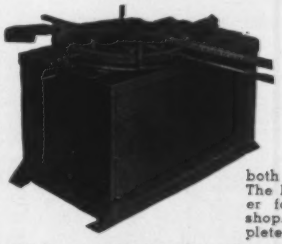
KARDONG FOUR-WAY BENDER

For Concrete Reinforcing Steel

Model D-2



The Model D-2 Kardong Bender is a Four Direction Horizontal Bender. With this bender it is not necessary to turn bars over to make reverse or second bends on beam bars. The Model D-2 is made in two sizes. Model D-2 Standard 6-inch, which will bend bars around collars 2-inch to 6-inch and Model D-2 Special 8-inch, which will bend bars around collars 2-inch to 8-inch. Capacity of both models, 1¼-inch Square Bars. The Model D-2 is a production bender for reinforcing steel fabricating shop. Ask for catalog of our complete line of reinforcing bar-benders.

KARDONG BROTHERS, INC.
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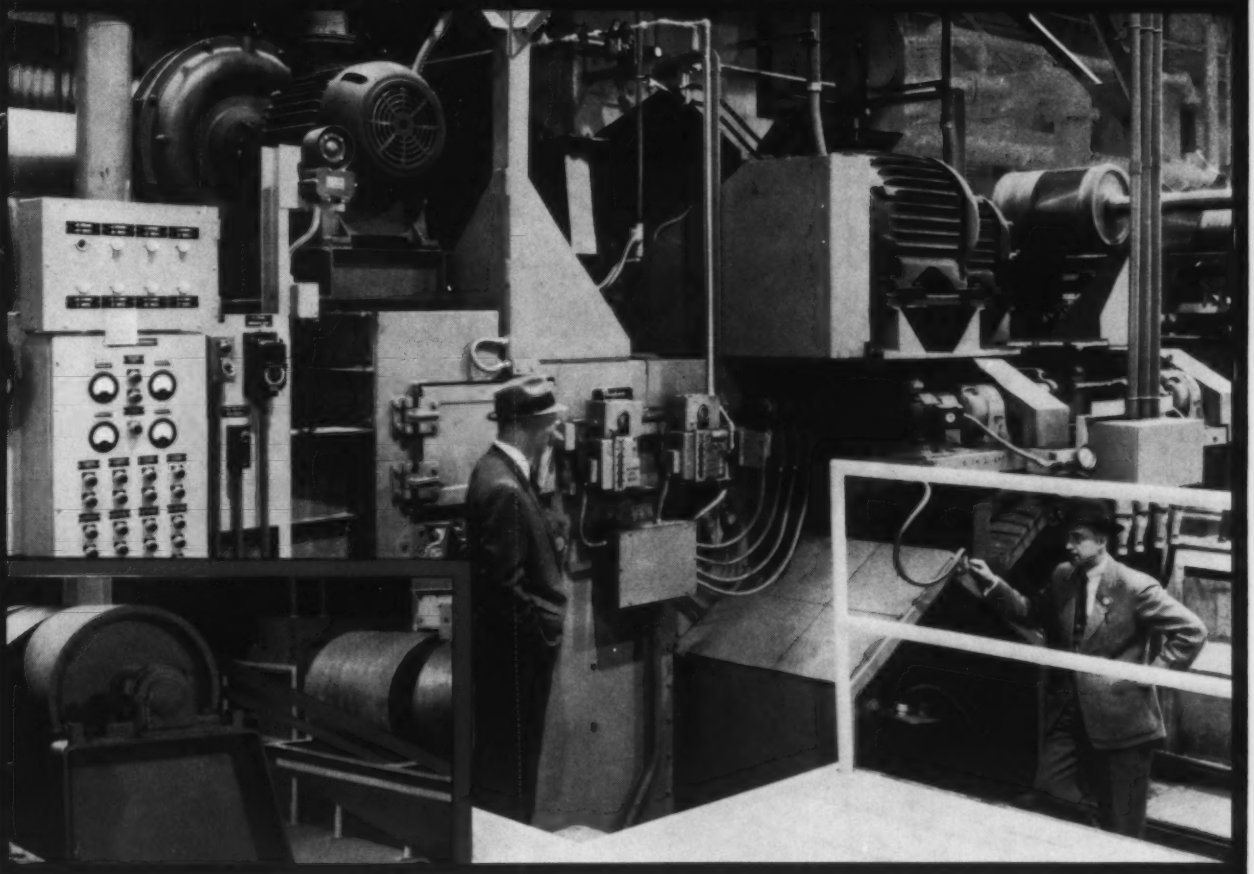
PUSH-BUTTON DESCALING WITH ROTOBLAST!



Universal Cyclops uses Pangborn Rotoblast Descaling for flexibility in automation

Devoted entirely to the production of cold rolled stainless steel strip, the new Coshocton, Ohio plant of Universal Cyclops Steel Co. is one of the most completely modern plants in the country.

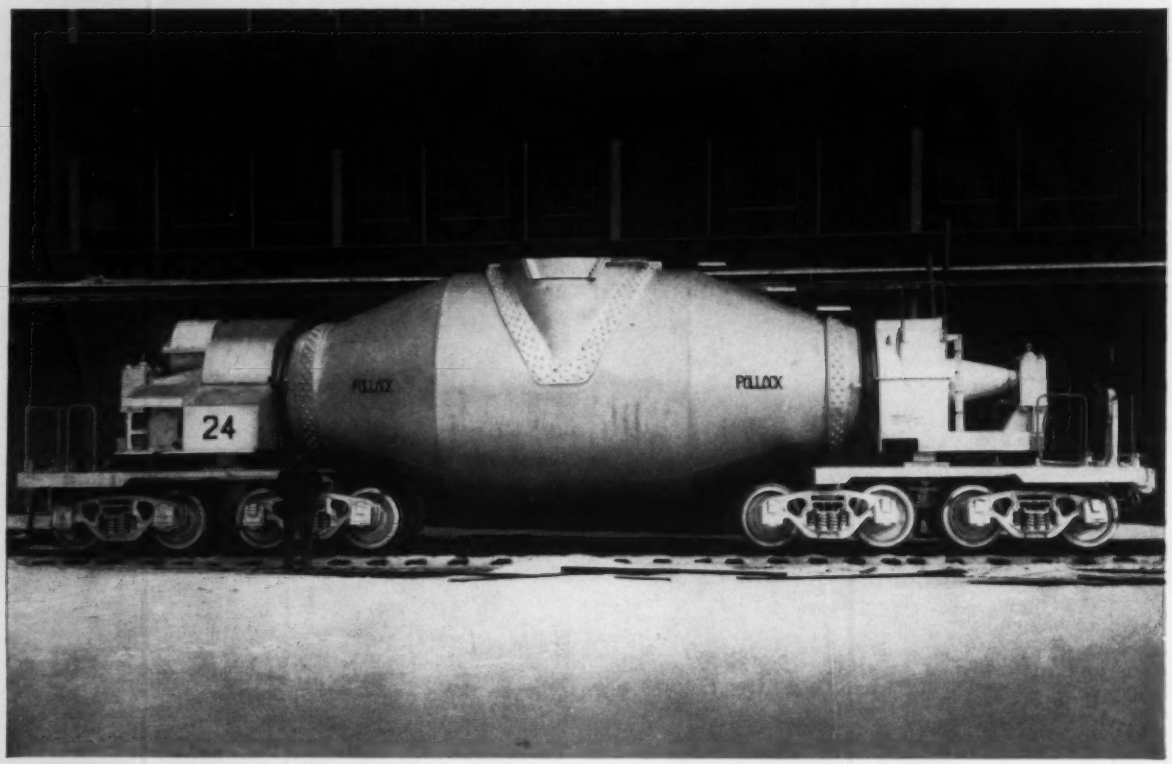
Among its advanced equipment, the company uses a Pangborn Rotoblast Descaling Machine in a 659 ft. fully-automated line. This machine—requiring no operator—continuously blast cleans two strands of steel simultaneously at speeds up to 80 LFM. To provide a high degree of flexibility, it has individual strand control and permits changing the position of Rotoblast wheels at the touch of a button. Abrasive velocity and volume are also variable and two-speed motors give a choice of 50 h.p. at 1200 RPMs or 75 h.p. at 1800 RPMs, depending on type and thickness of work.

Rotoblast's efficiency and adaptability to individual descaling problems have proved the value of Rotoblast to Universal Cyclops. They can in your plant. For more information, talk to the Pangborn man in *your* area or write PANGBORN CORPORATION, 1500 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment—Rotoblast Steel Shot and Grit.* ®

Pangborn

Cleans it fast with **ROTOBLAST®**

Hot car rolls on cool bearings—



Weighing a whopping total of 360 tons, this car transports 200 tons of hot metal from blast furnace to refining unit. To be sure of cool running wheel bearings to make the car roll easier, take the terrific loads and shock, the car manufacturer—The William B. Pollock Co.—specified Timken® heavy duty "All Purpose" tapered roller bearings, the type used on more and more of America's freight cars. Because Timken bearings *roll* the load they practically eliminate friction. Cars start and roll easier, saving power. And because of their tapered design Timken bearings take *both* radial and thrust loads. No auxiliary thrust collars are needed. Timken "AP" bearings come pre-assembled, pre-lubricated, ready to install. They will go 4 years without adding lubricant. Maintenance is reduced, car availability increased. By reducing friction, they cut locomotive wheel spinning, decrease wheel wear, eliminate flat spots on rails and increase rail life.

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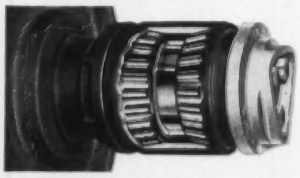
GREATER BEARING ACCURACY is assured through super-sensitive gages in our master gage laboratory, one of industry's finest. Some instruments measure even the thickness of several molecules.



Industry rolls on

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